Chapter 8
Biological Resources

8.1 Introduction

This chapter describes the impacts on biological resources that would result from the construction and operation of each of the build alternatives. The sections that follow describe the study area, the methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives for each of the following biological resources.

- Section 8.2, *Vegetation*
- Section 8.3, *Wildlife*
- Section 8.4, *Fish*
- Section 8.5, *Special-Status Species*

The regulations and guidance related to biological resources are summarized in Section 8.6, *Applicable Regulations*. Appendix I, *Wildfire Risk to Vegetation*, Appendix J, *Wildlife Resources and Special-Status Species*, and Appendix K, *Fish Resources*, provide further information on species of interest, assessment methods, and biological resource metrics. The contribution of the proposed rail line to cumulative impacts on biological resources is discussed in Chapter 18, *Cumulative Impacts*.

8.2 Vegetation

This section describes the impacts on vegetation that would result from construction and operation of each of the build alternatives. The subsections that follow describe the vegetation study area, the methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives on vegetation. The regulations and guidance related to vegetation are summarized in Section 8.6, *Applicable Regulations*. Appendix I, *Wildfire Risk to Vegetation*, provides further information regarding wildfire impacts on vegetation. The contribution of the proposed rail line to cumulative impacts on vegetation is discussed in Chapter 18, *Cumulative Impacts*.

Vegetation species addressed in this section are considered common; populations are secure and not vulnerable to decline. Species that are designated as at risk or populations that have been identified as declining by state or federal agencies are defined as a special-status species. Special-status plants that could be affected by the proposed rail line include bractless blazingstar, large-flowered beardtongue, Schweinitz' flatsedge, slender-branched popcorn-flower, narrowleaf milkweed, Barr's milkvetch, heavy sedge, woolly twinpod, nuttall desert-parsley, and double bladderpod. These species are discussed in Section 8.5, *Special-Status Species.*

In summary, five vegetation cover classes dominate the study area: lowland/prairie grassland, sagebrush steppe, conifer-dominated forest and woodland, floodplain/riparian, and agriculture. Sixteen Montana Department of Agriculture–designated noxious weed species have been reported in one or more of the counties in the study area. The length of each build alternative and its right-of-way acreage are the primary indicators of vegetation impacts.

Construction would affect the greatest number of acres of vegetation along the Tongue River Road Alternatives, which are the longest of the build alternatives; the fewest acres would be affected along the Colstrip Alternatives, which are the shortest of the build alternatives. The most common vegetation cover class that would be affected by the Tongue River Alternatives, Colstrip Alternatives, Tongue River Road Alternatives, and Moon Creek Alternatives would be lowland/grassland prairie and sagebrush steppe. The most common vegetation cover class that would be affected by the Decker Alternatives would be lowland/grassland prairie and conifer-dominated forest and woodland. The number of rail-induced wildfire occurrences and burn areas in Montana is low; wildfire risk along any build alternative would be low, given the wildfire risk assessment. However, small areas along the Tongue River Alternatives, Colstrip Alternatives, Tongue River Road Alternatives, and Moon Creek Alternatives would have higher wildfire risks (Appendix I, *Wildfire Risk to Vegetation*).

OEA concludes that, while the affected vegetation species are secure and not vulnerable to decline, construction and operation of the proposed rail line would result in some adverse impacts that would be minor.

8.2.1 Study Area

OEA defined the study area for vegetation as the area of vegetation cover within 5 miles of the centerline (a 10-mile-wide corridor) of each build alternative. Although this study area provides context for qualitatively assessing vegetation impacts, OEA's quantitative analysis focused on impacts on vegetation in the right-of-way.

8.2.2 Analysis Methods

OEA used the following methods to evaluate the impacts of construction and operation of the build alternatives on vegetation.

8.2.2.1 Vegetation Inside the Right-of-Way

OEA used data from the Montana Natural Heritage Program (MTNHP) *Montana Land Cover / Land Use Theme* (2013) in a geographic information system (GIS) analysis. The MTNHP framework is a baseline digital map of Montana's natural and human land cover; it has been adapted from the Northwest ReGAP land cover classification. Vegetation cover classes are from the Ecological System Classification (Comer et al. 2003) and land cover classes were developed by Anderson et al. (1976). Vegetation cover classes are a group of similar stands of vegetation with shared characteristics. OEA used data from the *West Side Wildfire Risk Assessment* (Oregon Department of Forestry, Western Forestry Leadership Coalition, and Council of Western State Foresters 2012) in a GIS analysis. OEA also incorporated data on noxious weed species to inform the analysis.

OEA assumed that the entire right-of-way would be disturbed by clearing, excavation, and the placement of fill material during rail construction. Some areas would be permanently disturbed (e.g., the rail line footprint), and some areas would be temporarily disturbed. It is unlikely that the entire right-of-way would be disturbed during construction; the exact locations of permanent and temporary disturbance within the right-of-way would be determined during final engineering and design. Therefore, OEA's assumption that the entire right-of-way would be disturbed most likely overestimates the actual impacts.

OEA overlaid the right-of-way GIS data layer and the MTNHP Montana Land Cover Framework GIS layer in a GIS model. OEA then calculated the number of acres of vegetation impacts that would result from construction in each right-of-way. In addition, OEA used the *West Side Wildfire Risk Assessment* GIS layer in a GIS model to determine the potential wildfire risk probability along each build alternative during construction and operation.

Additional vegetation impacts could occur during operation but cannot be quantified because the locations or frequencies of the operation impacts are unpredictable. However, operation impacts on vegetation are qualitatively described.

8.2.2.2 Vegetation Outside the Area of Permanent Disturbance

With the exception of the road relocations and construction of communications towers, electric power distribution lines, and operation buildings, vegetation beyond the right-of-way would not be filled, cleared, excavated, or touched in any other way during construction of any build alternative. Although impacts from construction and operation within the right-of-way could extend to vegetation beyond these areas of permanent disturbance, OEA could not determine the extent of these impacts because it is not possible to predict how this vegetation would react to rail construction or operation in the right-of-way itself. Therefore, OEA assessed the impacts on vegetation beyond the area of permanent disturbance qualitatively.

8.2.3 Affected Environment

The existing environmental conditions related to vegetation in the study area are described below.

8.2.3.1 Dominant Vegetation Cover Classes

Vegetation in the study area is typical of the Northern Great Plains. The varied topography supports shrubland and grassland interspersed with coniferous forest. Deciduous trees and shrubs are located in drainages and bottomlands. Plant species are adapted to extremes of winter cold and summer drought. Fire and drought are the principal sources of natural disturbance in the study area; the primary human-caused disturbance is livestock grazing.

Five vegetation cover classes dominate the study area, based on both the MTNHP Montana Land Cover Framework GIS data and the vegetation cover classes that OEA observed and documented during the 2013 wildlife baseline surveys (where dominant wildlife habitats were characterized).

- **Lowland and prairie grassland** is widespread and interspersed with shrubland and woodland. Grassland occurs in floodplains and in gentler terrain. Grassland meadows occur at higher elevations in the southern part of the study area. Common species include western wheatgrass (*Elymus smithii*), bluebunch wheatgrass (*Elymus spicatus*), little bluestem (*Schizachyrium scoparium*), needle and thread (*Stipa comata*), side-oats grama (*Bouteloua curtipendula*), smooth brome (*Bromus inermis*), great basin wildrye (*Elymus cinereus*), and cheat grass (*Bromus tectorum*).
- **Sagebrush steppe** occurs throughout the study area and is intermixed with grassland and woodland. Common species are silver sagebrush (*Artemisia cana*) and black greasewood (*Sarcobatus vermiculatus*) in the low-lying areas and big sagebrush (*Artemisia tridentata*) and saltbush (*Atriplex* spp.) in the upland areas.
- **Conifer-dominated forest and woodland** occur in the badland topography in the north and northwestern parts of the study area and at higher elevations between Ashland and

Colstrip. In addition, this vegetation cover class dominates the southern part of the study area. Common species are ponderosa pine (*Pinus ponderosa*), with juniper (*Juniperus scopulorum*) groves at lower elevations on lower slopes and at higher elevations along canyons and cliffs.

- **Floodplain and riparian areas** occur primarily along the Tongue River and its tributaries. Large swaths of riparian areas occur at the confluence of the Tongue River and Yellowstone River and just north of Ashland. Isolated patches of riparian areas occur along the major tributaries of the Tongue River, with small stands of cottonwood, green ash, and willow. Floodplain and riparian areas are also present along Rosebud Creek. Vegetation consists of cottonwood (*Populus* spp.), green ash (*Fraxinus pennsylvanica*), and box elder (*Acer negundo*), with an understory of willow (*Salix* spp.), chokecherry (*Prunus virginiana*), western snowberry (*Symphoricarpos occidentalis*), Osage orange (*Maclura pomifera)*, buffaloberry (*Shepherdia* spp.), and wild rose (*Rosa* spp.).
- **Agriculture** areas dominate along the Tongue River and its major tributaries. Vegetation consists of alfalfa hay meadows, mixed-grass haylands, corn, sorghum, wheat, and barley.

Table 8.2-1 shows the relative abundance of the vegetation cover classes in the study area, based on the MTNHP Montana Land Cover Framework GIS data, and Figure 8.2-1 depicts the distribution of vegetation cover classes in the study area. Table 8.2-2 provides the MTNHP definition of each vegetation cover class.

Table 8.2-1. Relative Abundance of Vegetation Cover Classes in Study Area

Vegetation Cover Class	Study Area Cover[a] (%)	Vegetation Cover Class	Study Area Cover (%)
Lowland/prairie grassland	37	Developed	1
Sagebrush steppe	23	Introduced vegetation	< 0.1
Conifer-dominated forest and woodland (xeric-mesic)	17	Cliff, canyon, and talus	< 0.1
Bluff, badland, and dune	7	Scrub and dwarf shrubland	< 0.1
Agriculture	5	Deciduous shrubland	< 0.1
Floodplain and riparian	4	Depressional wetland	< 0.1
Recently burned	2	Herbaceous marsh	< 0.1
Open water	1	Montane grassland	< 0.1
Mining	1	Deciduous-dominated forest and woodland	0.3

Notes:
[a] This is the percentage of the vegetation study area that is covered by each of the vegetation cover classes
Source: Montana Natural Heritage Program 2013

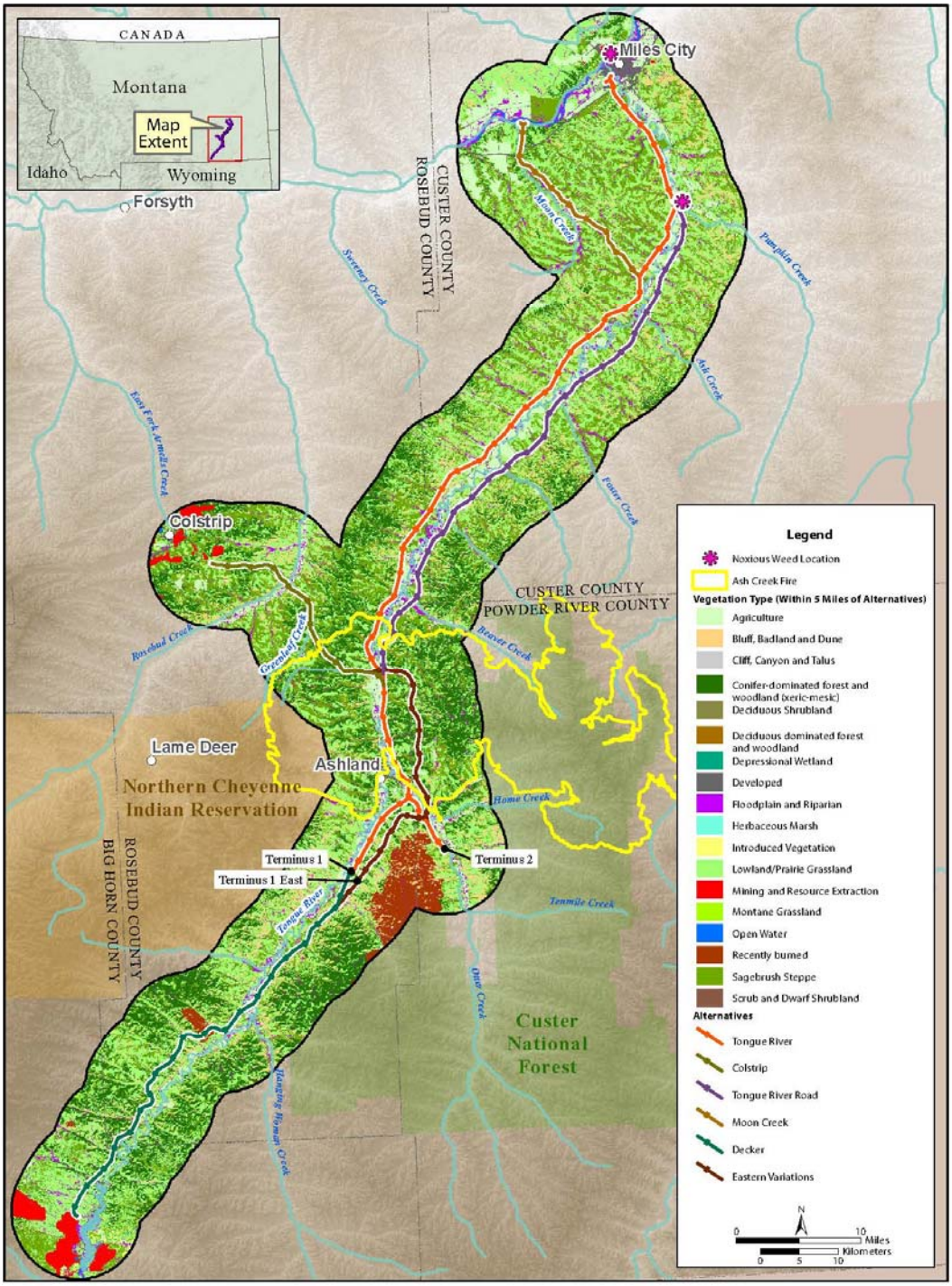

Figure 8.2-1. Vegetation

Table 8.2-2. MTNHP Definitions of Vegetation Cover Classes

Vegetation Cover Class	Description
Agriculture	Summer fallow farmland: A method of farming in arid and semi-arid areas without using irrigation, which consists of cultivating a given area in alternate years (usually every other year), allowing moisture to be stored in the un-cropped (fallow) year. Even if grain crops are occasionally sequenced with alfalfa or other nitrogen-fixing crops, the land will be classified as fallow if grain is the principle crop. Continuously cropped: A method of farming without irrigation in which crops are grown a majority of the time as part of a normal farming practice. Christmas tree plantations and fruit orchards are classified as continuously cropped farmland. Non-irrigated hayland: A method of farming whereby hay is cut a majority of the years. Native vegetation cut for hay yearly or the majority of the time over a period of years. Non-irrigated alfalfa and other domestic varieties cut for hay yearly or the majority of the time. Irrigated land: A method of farming that uses engineered water delivery systems to apply water to hayland or cropland to increase production. All hayland and cropland that is irrigated a majority of the time over the long term.
Lowland/prairie grassland	Low-elevation grassland systems. Herbaceous: Herbs (graminoids, forbs, and ferns) dominant (generally forming at least 25% cover; trees, shrubs, and dwarf-shrubs generally with less than 25% cover). Herb cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and nonvascular cover, respectively.
Conifer-dominated forest and woodland (xeric-mesic)	Natural coniferous forest and woodland systems occurring in dry to moderately moist conditions. Evergreen: Greater than 75% of the total woody cover is never without green foliage. Forest: Trees with their crowns overlapping (generally forming 60% to 100% cover). Woodland: Open stands of trees, with crowns not usually touching (generally forming 25% to 60% cover). Canopy tree cover may be less than 25% in cases where it exceeds shrub, dwarf-shrub, herb, and nonvascular cover, respectively.
Sagebrush steppe	Artemisia-dominated steppe (between 10% and 40% shrub cover).
Bluff, badland, and dune	Badlands and inland dunes composed of barren and sparsely vegetated substrates.
Deciduous-dominated forest and woodland	Natural deciduous forest and woodland systems, with the exception of riparian systems. Deciduous: Greater than 75% of the total woody cover sheds its foliage simultaneously in connection with the unfavorable season. Forest: Trees with their crowns overlapping (generally forming 60% to 100% cover). Woodland: Open stands of trees, with crowns not usually touching (generally forming 25% to 60% cover). Canopy tree cover may be less than 25% in cases where it exceeds shrub, dwarf-shrub, herb, and nonvascular cover, respectively.
Floodplain and riparian	Floodplain (bottomland): The nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream. Riparian: A narrow zone of habitats, which may or may not be vegetated, directly associated with streams or lakeshores or similar immediately adjacent habitat.
Introduced vegetation	Introduced upland and riparian communities dominated by invasive alien species. Though these communities are often casually considered as "planted/cultivated," they are spontaneous, self-perpetuating, and not the (immediate) result of planting, cultivation, or human maintenance. Land occupied by invasive communities is generally permanently altered (converted) unless restoration efforts are undertaken.
Open water	All areas of open water, generally with less than 25% cover of vegetation or soil.

Vegetation Cover Class	Description
Developed	Developed, open space: Areas with a mixture of some constructed materials but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes. Developed, low intensity: Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% of total cover. These areas most commonly include single-family housing units. Developed, medium intensity: Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
Scrub and dwarf shrubland	Native, non-riparian scrub and dwarf shrubland not dominated by *Artemisia* spp. Dwarf-shrubland: Low-growing shrubs, usually under 0.5 meter tall. Individuals or clumps, overlapping to not touching (generally forming more than 25% cover; trees and tall shrubs generally less than 25% cover). Dwarf shrub cover may be less than 25% where it exceeds tree, shrub, herb, and nonvascular cover, respectively.
Recently burned	Recently burned forest, shrubland, or grassland systems.
Cliff, canyon and talus	Barren and sparsely vegetated landscapes (generally < 10% plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. Also included is vegetation of unstable scree and talus slopes that typically occur below cliff faces.
Deciduous shrubland	Native, nonriparian deciduous shrubland. Shrubland: Shrubs generally greater than 0.5 meter tall, with individuals or clumps overlapping to not touching (generally forming more than 25% cover; trees generally less than 25% cover). Shrub cover may be less than 25% where it exceeds tree, dwarf-shrub, herb, and nonvascular cover, respectively. Vegetation dominated by woody vines is generally treated in this class.
Depressional wetland	Wetland ecological systems were defined following a non-regulatory definition for wetlands, emphasizing three important attributes: (1) the hydrology is such that there is some degree of flooding or soil saturation, (2) the vegetation is composed of plants that are adapted to grow in water or in a soil or substrate that is occasionally oxygen deficient because of saturation (hydrophytes), and (3) the soils were saturated long enough during the growing season to produce oxygen-deficient conditions in the upper part of the soil, which commonly includes the major part of the root zone of plants (hydric soils).
Herbaceous marsh	The emergent wetland class is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included, except subtidal and irregularly exposed.
Montane grassland	Grassland systems occurring from lower montane to upper montane-subalpine elevations. Herbaceous: Herbs (graminoids, forbs, and ferns) dominant (generally forming at least 25% cover; trees, shrubs, and dwarf-shrubs generally with less than 25% cover). Herb cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and nonvascular cover, respectively.
Deciduous-dominated forest and woodland	Natural deciduous forest and woodland systems, with the exception of riparian systems. Deciduous: Greater than 75% of the total woody cover sheds its foliage simultaneously in connection with the unfavorable season. Forest: Trees, with their crowns overlapping (generally forming 60% to 100% cover). Woodland: Open stands of trees, with crowns not usually touching (generally forming 25% to 60% cover). Canopy tree cover may be less than 25% in cases where it exceeds shrub, dwarf-shrub, herb, and nonvascular cover, respectively.
Mining	Strip mines and gravel pits.

Notes:
Source: Montana Natural Heritage Program 2013

8.2.3.2 Wildfire Ecology

Wildfires are a common occurrence in Montana and can affect vegetation. Wildfires are part of the normal vegetative cycle and an integral part of healthy forest and grassland growth and regeneration (Montana Department of Military Affairs Disaster and Emergency Services 2010). According to the U.S. Global Climate Change Research Program (2009), wildfires in the United States are increasing because of warming temperatures. In the western United States, the incidence of large wildfires has increased in recent decades, with greater fire frequency, longer fire durations, and longer wildfire seasons. This increase is strongly associated with increased spring and summer temperatures and earlier spring snowmelt, which dry the soils and vegetation (U.S. Global Climate Change Research Program 2009).

In eastern Montana, dry grass associated with rangeland and farmland is the primary fuel for wildfires, and the dry conditions of eastern Montana favor fire risk. The windy conditions that are typical of eastern Montana can cause wildfires to spread rapidly (Montana Department of Military Affairs Disaster and Emergency Services 2010). Montana Department of Natural Resources and Conservation (DNRC) data for fire starts in Montana from 1981 through 2010 show that 48 percent of wildfires were caused by lightning, and 52 percent were caused by humans. Human-caused fires include debris burns (14 percent), campfires (11 percent), equipment operation (4 percent), and railroad operation (4 percent) (Montana Department of Military Affairs Disaster and Emergency Services 2010). Table 8.2-3 presents DNRC data on railroad-caused fires in Montana in relation to all wildfires in Montana (2007 to 2011).

Table 8.2-3. Rail-Caused Fires and Acres Burned Compared with All Montana Fires

Year	Number of Fires Caused by Railroads	Acres Burned by Railroad-Caused Fires	Total Number of Fires in Montana	Total Acres Burned in Montana
2011	3	1	323	31,064
2010	5	6.7	278	40,115
2009	No data	No data	No data	No data
2008	9	17	243	138,917
2007	9	17	504	148,852

Notes:
Sources: Montana Department of Natural Resources and Conservation 2007, 2008, 2010, 2011

The consistently low number of railroad-caused fires and low amount of acreage burned may be a result of two Montana State laws that require railroads to control fire hazards in rail rights-of-way: Montana Code Annotated (MCA) 69-14-721 and MCA 69-14-722 (Section 8.6, *Applicable Regulations*).

Given the 2013 MTNHP vegetation cover class data, three recent fires in the study area, none caused by the railroad, burned 18,543 acres (Figure 8.2-1). The largest recently burned area is just south of Ashland in the Custer National Forest; the burned area extends beyond the

study area to the east. The second recently burned area is approximately 14 miles north-northwest of the Tongue River Reservoir and entirely within the study area. The smallest recently burned area is approximately 4.5 miles north-northwest of the Tongue River Reservoir and entirely within the study area.

The Ash Creek Fire burned large areas of Rosebud and Powder River Counties around the Ashland area in 2012 (Figure 8.2-1). Most woodland was completely lost (all trees, shrubs, and grasses were destroyed). Pockets of ponderosa pine and juniper trees survived the burns in the more rugged and rocky terrain. Riparian structure along the Tongue River was almost entirely lost; however, in late summer of 2013, OEA documented rejuvenation and colonization during wildlife baseline surveys. Because precipitation was frequent in spring and summer of 2013, OEA observed abundant wildflowers and grasses in burned areas and sprouts at the base of many burned cottonwoods.

8.2.3.3 Invasive and Noxious Weeds

Noxious weeds are plants that are detrimental to the economy and the environment, affecting animal health, human health, and native vegetation. They are often difficult to control and eradicate. Noxious weeds concern local landowners in the study area because they can adversely affect the quality of the land for livestock grazing. Noxious weed management in Montana is divided into four priorities (Montana Department of Agriculture 2013).

- Priority 1A noxious weeds are not present or have very limited presence in Montana; management criteria require eradication if detected, education, and prevention.
- Priority 1B noxious weeds have limited presence in Montana; management criteria require eradication or containment and education.
- Priority 2A noxious weeds are common in isolated areas in Montana; management criteria require eradication or containment where less abundant.
- Priority 2B noxious weeds are abundant in Montana and widespread in many counties; management criteria require eradication or containment where less abundant.

One Priority 1B, 14 Priority 2B, and one Priority 2A noxious weed species have been reported in one or more counties of the study area; no Priority 1A noxious weeds have been reported (Table 8.2-4).

The Montana Department of Agriculture also lists three plants as Priority 3 plants, which are regulated plants that could have negative impacts on native species but are not considered noxious weeds by the department. The three Priority 3 species are cheatgrass, hydrilla, and Russian olive. Cheatgrass is found in all Montana counties, Russian olive is found in several Montana counties (including the four counties of the proposed rail line), and hydrilla has not been found in Montana.

Table 8.2-4. Noxious Weeds Potentially Occurring in the Study Area

County	Priority 1B Noxious Weeds	Priority 2B Noxious Weeds	Priority 2A Noxious Weeds
All Counties	—	Canada thistle Field bindweed Leafy spurge Spotted knapweed Whitetop or hoary cress Russian knapweed Houndstongue Yellow toadflax[a] Tamarisk (saltcedar)	—
Custer	Purple loosestrife	Dalmatian toadflax Diffuse knapweed	Perennial pepperweed
Powder River	--	Diffuse knapweed St. Johns wort Common tansy[b]	—
Big Horn	Purple loosestrife	Dalmatian toadflax Diffuse knapweed[b] St. Johns wort[b] Sulfur cinquefoil	Perennial pepperweed[b]
Rosebud	Purple loosestrife[2]	Dalmatian toadflax Sulfur cinquefoil Common tansy[b]	—

Notes:
[a] Historically present; not currently reported in Custer, Big Horn, and Powder River Counties
[b] Historically present; not currently reported
Source: Montana Noxious Weed Summit Advisory Council 2008

Noxious weeds are typically associated with areas where the ground surface has been disturbed and are commonly found along roads, in residential areas, on agricultural lands, and on other developed or disturbed sites. Less than 0.1 percent of the vegetation mapped in the study area consists of noxious weeds (*Introduced vegetation* class in Table 8.2-1). These locations are concentrated primarily around Miles City and on the east and southwest sides of the Tongue River Reservoir (Figure 8.2-1). Other noxious weed locations are smaller and scattered along Tongue River Road and agricultural areas along the Tongue River. Approximately 1 percent of the study area consists of developed and mining areas. These disturbed lands can be another source of noxious weeds.

Montana Fish, Wildlife & Parks (Montana FWP) has identified noxious weed locations on Montana FWP fishing access sites in Montana; the Montana Department of Agriculture collected this information each summer from 2005 through 2009 (Montana Fish, Wildlife & Parks 2010). Two Montana FWP fishing access sites in the study area have documented noxious weed infestations: the Twelve Mile Dam Fishing Access Site on the Tongue River and Roche Jaune Fishing Access Site on the Yellowstone River (Figure 8.2-1). Five noxious weed infestations were identified at the Twelve Mile Dam Fishing Access Site: two sites infested with Canada thistle and three sites infested with field bindweed; all sites are less than 0.1 acre. Three noxious weed infestations were identified at the Roche Jaune Fishing

Access Site: two sites infested with field bindweed and one site infested with leafy spurge. The leafy spurge site is less than 0.1 acre. One field bindweed site is less than 0.1 acre, and the other bindweed site is between 0.1 acre and 1 acre.

8.2.4 Environmental Consequences

Impacts on vegetation would result from construction and operation of any build alternative. The impacts common to all build alternatives are presented first, followed by impacts specific to the build alternatives.

8.2.4.1 Impacts Common to All Build Alternatives

Construction

The construction impacts discussed below are common to all build alternatives.

Construction of the proposed rail line would require clearing, excavating, and filling the right-of-way, which would result in the temporary and permanent loss or alteration of vegetation. Some vegetation could be cleared beyond the right-of-way if communications towers and operation buildings are sited outside the right-of-way, at locations to be determined during final design. In addition, road relocations would require clearing and filling that would permanently remove vegetation. Construction could affect vegetation beyond the right-of-way because of dust creation and deposition, the introduction of noxious weeds, and wildfire alteration. The extent of such impacts would vary based on the affected vegetation, relative abundance of vegetation, soil conditions, hydrology, topography, and the extent of topographic modification required for construction.

The intensity of construction impacts on vegetation would depend on the total acreage that would be affected for each build alternative (Section 8.2.4.2, *Impacts by Build Alternativ*e). Impacts on other resources associated with or dependent on vegetation are described in Section 8.3, *Wildlife;* Section 8.5, *Special-Status Species*; and Section 9.5, *Wetlands*.

- **Result in Permanent Loss of Vegetation from Vegetation Clearing and Fill Placement**

  Placement of fill material for the proposed line would result in the permanent loss of vegetation. Clearing of shrub and forest vegetation would alter and most likely permanently change the vegetation cover class to nonwoody herbaceous cover classes. Some natural vegetation regrowth would occur, but construction would alter vegetation and regrowth would most likely be sparse in areas that would be continually disturbed by railroad operation. Vegetation restoration could occur in temporarily disturbed areas, as could revegetation by natural succession. Natural restoration would be affected by periodic vegetation maintenance in the right-of-way (Section 8.2.4.1, *Impacts Common to All Build Alternatives, Operation*).

- **Constrain Plant Germination and Growth through Soil Compaction and Erosion**

  The movement of heavy equipment and supplies during construction could compact the soil, affecting vegetation germination and growth. Compaction is caused when soil particles are squeezed together, making soils denser, oxygen-deprived, and less able to absorb water (Alabama Cooperative Extension System 2013). This condition would inhibit seed germination and root penetration in the soil surface and could result in bare soil or sparsely vegetated areas. Vegetation removal and soil compaction would expose soil to the erosive forces of rain and overland stormwater runoff, causing sediment to smother vegetation within and beyond the right-of-way, especially in areas with steep terrain.

- **Contribute to the Spread of Noxious Weeds**

  Rail construction could introduce and increase the spread of noxious weeds in the following ways.

  - Construction equipment could carry noxious weed seeds or plant parts from infested areas outside of the rail construction area into the rail construction area.
  - Construction equipment could disturb existing noxious weed infestations in the right-of-way and cause the spread of these infestations.
  - Overburden and cut materials containing noxious weeds could be transferred to offsite locations.
  - Fill material containing noxious weeds could be used.
  - Seed mixtures containing noxious weed seeds could be used for revegetation.

  Noxious weeds introduced during rail construction activities could compete with native vegetation. Noxious weeds are often more aggressive than native vegetation, and the disturbed conditions of a construction site create an environment (e.g., bare and compact soil, disturbed surfaces) where some noxious weeds thrive. Noxious weeds that encroach beyond the right-of-way could out-compete native vegetation and result in altered vegetation structure, a reduction in plant species richness, and overall disruption of the plant ecosystem.

- **Affect Plant Growth through Dust Deposition**

  The operation of heavy construction equipment could generate fugitive dust from loose soil. Any accumulation of fugitive dust on vegetation could affect plant growth by inhibiting photosynthesis and reducing vegetation density and plant diversity. More tolerant native plant species could benefit from decreased competition. However, noxious weeds could colonize and disrupt the overall plant ecosystem. The magnitude

and duration of dust exposure, tolerance of native vegetation, and aggressiveness of noxious weeds would determine vegetation response and the intensity of impacts.

- **Increase the Risk of Sparking Wildfires**

  Vegetation clearing and earthmoving construction equipment could start wildfires during construction. The greatest wildfire danger would occur during vegetation clearing within the right-of-way when construction equipment is working among vegetative fuels that could ignite. Potential wildfire ignition sources during construction would include exhaust sparks (carbon particles) escaping from the exhaust systems of earthmoving equipment, sparks from blades scraping against rocks, poorly maintained equipment (such as braking systems that create sparks), and hot exhaust systems on portable equipment (i.e., chainsaws, brush cutters, generators).

- **Increase the Risk of Damaging Wildfires**

  Vegetation clearing in the right-of-way would create a gap in vegetation that could act as a firebreak and prevent wildfires from crossing the right-of-way. This disruption of the fire cycle would cause fuel to accumulate on either side of the right-of-way and increase the risk of more intense wildfires. Subsequent fires would cause more damage to vegetation and prolonged vegetation recovery periods. Vegetation separated by the right-of-way and responding to different fire cycles could lead to decreased biodiversity from different rates of ecological succession.

- **Alter Riparian and Floodplain Vegetation by Changing Hydrology**

  Construction in floodplains could affect riparian and floodplain vegetation by altering the natural drainage patterns and floodplain storage capacity. These alterations could change the average water level. A higher water level could cause riparian and floodplain vegetation to become submerged, thereby changing plant composition. Impacts on vegetation beyond the right-of-way could occur if the altered drainage patterns and mean high water lines were to extend beyond the right-of-way. The extent of such impacts would vary based on topographic modifications in floodplain areas. This would depend on the characteristics of the rail line, which would be determined during the final engineering process.

Operation

The operation impacts discussed below are common to all alternatives. The severity of the impact would vary, depending on the volume of train traffic, required maintenance, and length of the build alternative.

The primary operation activities that could affect vegetation are maintenance, incidental pollutant discharges from train operation, and wildfires. Train traffic on the proposed rail line would be 7.4 trains per day under the low coal production scenario but could be as high

as 26.7 trains per day under the high coal production scenario.[1] The number of trains per day would not change the types of operation impacts, but it could affect the frequency of the impact (e.g., more trains could result in increased maintenance activities).

- **Alter Vegetation from Maintenance Activities**

  Maintenance activities would include controlling vegetation in the right-of-way and maintaining tracks, access roads, ditches, bridges, culverts, and other associated rail infrastructure. These activities would be infrequent and brief. Vegetation would be periodically cleared or trimmed in the right-of-way, which could permanently alter vegetation (e.g., shrub vegetation that is continuously cleared for maintenance could convert to herbaceous vegetation). Maintenance activities could disturb the ground surface, require the use of chemicals (such as herbicides), or result in petroleum leaks and spills from maintenance vehicles and equipment. Any mobilized sediment, spilled chemicals, or petroleum products could reach adjacent vegetation, affecting plant density and diversity and degrading the plant ecosystem.

  Maintenance equipment and vehicles would generate fugitive dust from loose soil and gravel access roads. Any accumulation of fugitive dust on vegetation within or beyond the right-of-way could affect plant growth by inhibiting photosynthesis and reducing vegetation density and diversity. This could also allow invasive plant species to colonize, which could reduce plant species richness.

- **Affect Vegetation through Pollutant Deposition**

  Rail operation would deposit pollutants that could affect vegetation. The two most important types of pollutants connected with railway transport are polycyclic aromatic hydrocarbons (PAHs) and heavy metals (Wilkomirski et al. 2010). PAHs occur naturally in air, water, and soil but can also be manufactured. They are found in substances such as asphalt, oil, coal, and creosote (Agency for Toxic Substances and Disease Registry 1995). The main sources of PAHs around rail lines are substances used for rolling stock use, such as machine grease, fuel oils, and transformer oils (Wilkomirski et al. 2011). Heavy metals in emissions and rail car materials can accrue on plants and in soil (Wilkomirski et al. 2011). Stormwater discharges from the railbed and access roads could convey low concentrations of these pollutants to vegetated areas. Some plant species accumulate and tolerate PAHs (Simonich and Hites 1994 in Liu et al. 2009). However, PAHs can also stunt plant growth and affect root physiology (Liu et al. 2009). Heavy metals may inhibit growth and damage plant physiology, but plants also have resistance mechanisms against toxic effects (Cheng 2003). Any releases of PAHs and heavy metals associated with rail operation could degrade vegetation near the rail line.

[1] The coal production scenarios (low, medium, high) reflect different levels of rail traffic, depending on which build alternative is licensed, which mines are induced or developed, and the production capacities of those mines. The coal traffic scenarios are described in Appendix C, *Coal Production and Markets.* The related rail traffic is summarized in Chapter 2, Section 2.3.3, *Rail Traffic*.

Coal dust impacts are assessed in Chapter 6, *Coal Dust*. Ecological impacts could occur if plants are exposed to coal dust and its constituents in soils. However, OEA found that coal dust constituent concentrations in soils were below screening levels for ecological exposure.

- **Result in Wildfires**

The two most common reasons for railroad-caused fires are exhaust sparks (carbon particles, such as chunks or flakes) emitted from the locomotive engine and hot brake shoe fragments; other less common causes include controlled burn fires, grinding, cutting and welding, smoking, and discarded railroad flares (California Department of Forestry and Fire Protection et al. 1999). Idling and acceleration plus deceleration and downgrades factor into when and where exhaust sparks are most likely to be emitted from a locomotive (California Department of Forestry and Fire Protection et al. 1999). Maximum carbon particle buildup in a locomotive occurs during idling or operation at minimum power, and maximum carbon particle ejection occurs when power is applied after a period of idling. Locomotives may be operated at idle or minimum power in yards and sidings (where trains park), while negotiating downgrades, and while decelerating for a stop or for a restricted speed zone (California Department of Forestry and Fire Protection et al. 1999). Other than yard exits and sidings, the areas most likely to experience exhaust-spark fires are where long downgrades change to level or upgrade track and where changing from level to steep upgrade track (California Department of Forestry and Fire Protection et al. 1999). Each of the build alternatives would require at least one siding (location[s] would be determined during project design), which would increase the potential for locomotive carbon particle buildup and emission, increasing the potential for a wildfire ignition. The locomotive would also be stopped or operating at minimum power at the mine site where coal would be loaded into rail cars. Many grade changes would occur over variable lengths along all of the rights-of-way (Chapter 13, Section 13.3.1, *Topography*) and could cause carbon particle buildup and emission. With the advent of composition brake shoes, brake shoe sparks and fragments are much less common, unless the shoe is worn out (California Department of Forestry and Fire Protection et al. 1999).

A review of wildfire records in Montana indicates that railroads can start wildfires, but the occurrence and acreage burned is very low compared with lightning and human causes (Section 8.2.3.2, *Wildfire Ecology*, Table 8.2-3). Although Montana law requires railroads to control fire hazards in the right-of-way (Section 8.6, *Applicable Regulations*), railroad-caused fires could spread beyond the right-of-way because of unpredictable and uncontrollable factors (Appendix I, Section I.1.2, *Wildfire Behavior*). This uncertainty makes it difficult to predict patterns of wildfires ignited by a railroad. A recent wildfire risk assessment of 17 western states, including Montana (Appendix I, Section I.1.3, *Wildfire Risk Assessment*), quantified the risk of wildfires. The assessment establishes a

fire threat index (FTI) that allows comparison of wildfire risk among the build alternatives (Section 8.2.4.2, *Impacts by Built Alternative*).

If railroad operation starts a fire, impacts on vegetation would vary, depending on the conditions at the time of the wildfire and on prevention and suppression efforts. Some wildfires alter vegetation structure in relatively subtle ways (reducing litter and dead herbs in small areas). Other wildfires change nearly every aspect of vegetation structure. Woody plants may be stripped of foliage and killed; litter and organic matter may be consumed, exposing mineral soil; and underground structures, such as roots and rhizomes, may be killed (e.g., in most coniferous trees) or rejuvenated (e.g., in many grass and shrub species, aspen, and oak) (U.S. Forest Service 2000).

8.2.4.2 Impacts by Build Alternative

The impacts on vegetation that are specific to each build alternative are described below and are represented in the following figure and tables.

- Figure 8.2-2 shows the FTI categories along each of the build alternatives.
- Table 8.2-5 shows the total acres of vegetation within the right-of-way for each build alternative.
- Table 8.2-6 shows the impact on various vegetation cover classes that would result from the road relocations required for each build alternative.
- Table 8.2-7 shows acreages in the right-of-way by FTI category for each build alternative.

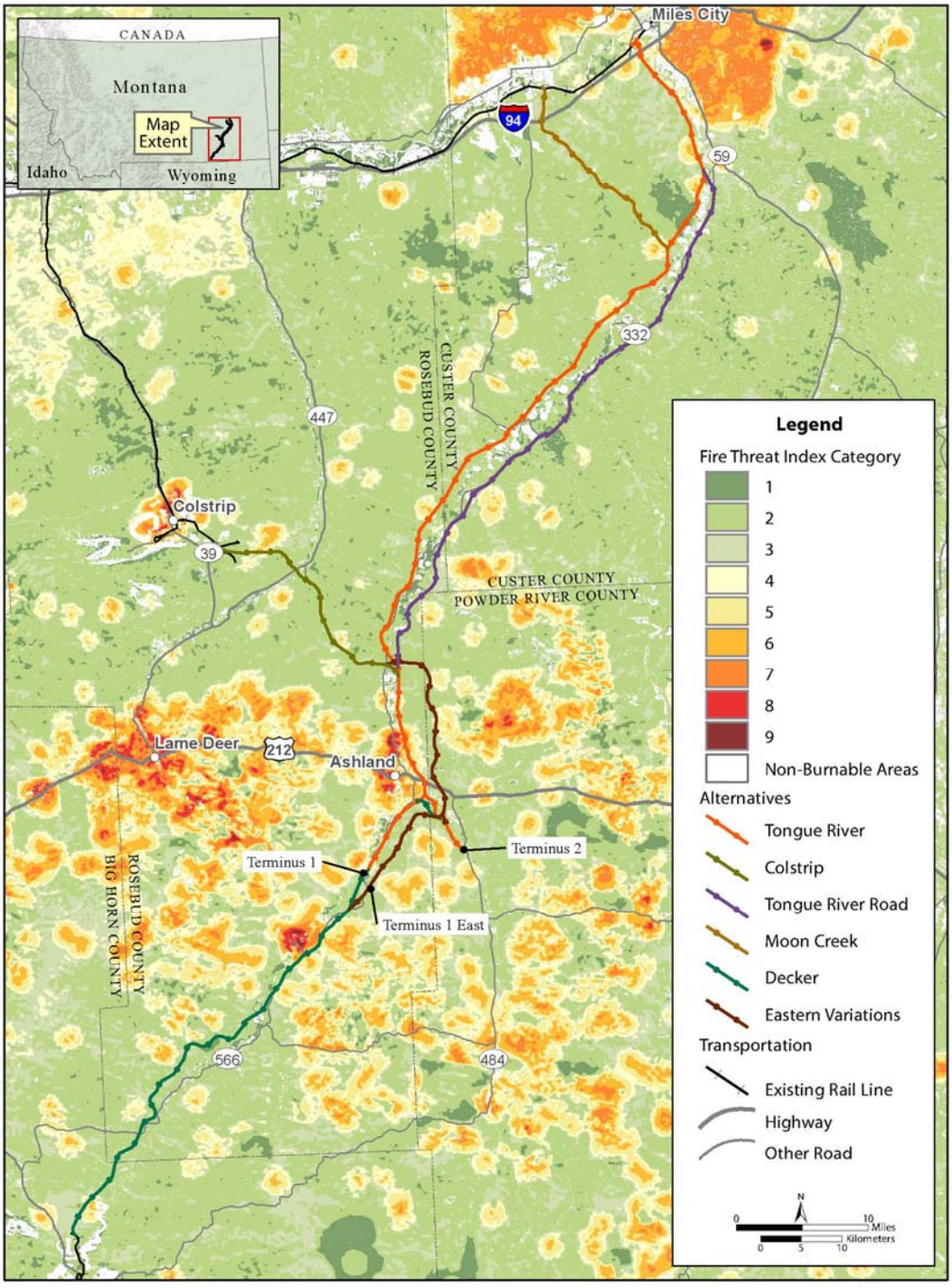

Figure 8.2-2. Fire Threat Index

Table 8.2-5. Impacts on Vegetation Cover Classes in the Right-of-Way of Each Build Alternative (acres)

Vegetation Cover Class[a]	Tongue River	Tongue River East	Colstrip	Colstrip East	Tongue River Road	Tongue River Road East	Moon Creek	Moon Creek East	Decker	Decker East
Lowland/prairie grassland	1,644	1,588	643	593	1,736	1,679	1,618	1,562	1,397	1,263
Sagebrush steppe	1,010	1,088	570	684	1,270	1,313	1,118	1,196	360	347
Conifer-dominated forest and woodland	358	408	443	502	409	464	357	407	509	520
Bluff, badland, and dune	378	379	96	97	227	229	432	433	320	337
Agriculture	141	104	94	34	296	259	252	216	5	5
Floodplain and riparian	159	167	49	63	156	160	171	179	69	69
Recently burned	—	—	—	—	—	—	—	—	88	88
Scrub and dwarf shrubland	1	1	—	—	1	1	—	—	3	3
Deciduous shrubland	< 1	—	< 1	—	< 1	-	< 1	—	—	—
Herbaceous marsh	1	1	—	—	< 1	< 1	—	—	< 1	< 1
Deciduous-dominated forest and woodland	8	8	4	5	5	6	5	5	2	2
Total	3,700	3,744	1,899	1,978	4,100	4,111	3,953	3,998	2,753	2,634

Notes:

[a] Developed land, open water, mining, and cliff/canyon/talus cover classes are not included in table because they are not vegetation. In addition, depressional wetland, herby marsh, and montane grassland were not mapped in the right-of-way of any build alternative and are not included in this table.

Source: Montana Natural Heritage Program 2013

Table 8.2-6. Impacts on Vegetation Cover Classes in Road Relocations of Each Build Alternative (acres)

Vegetation Cover Class[a]	Tongue River	Tongue River East	Colstrip	Colstrip East	Tongue River Road	Tongue River Road East	Moon Creek	Moon Creek East	Decker	Decker East
Lowland/prairie grassland	14	10	9	5	12	8	16	11	6	6
Sagebrush steppe	5	5	16	15	5	4	7	6	3	4
Conifer-dominated forest and woodland	<1	-	1	<1	1	<1	1	<1	<1	<1
Bluff, badland, and dune	2	1	1	<1	2	2	2	1	4	4
Agriculture	3	2	1	1	3	2	3	2	-	-
Floodplain and riparian	1	1	2	1	2	2	2	1	<1	<1
Deciduous-dominated forest and woodland	-	-	<1	<1	<1	<1	<1	<1	-	-
Total	25	19	30	22	25	18	31	21	13	14

Notes:

[a] Impact acreages are only for areas where the road relocations are outside of the right-of-way (because road relocation impacts inside the right-of-way have already been accounted for in Table 8.2-5). Developed land, open water, mining, and cliff/canyon/talus cover classes are not included in table because they are not vegetation. In addition, recently burned, introduced vegetation, scrub and dwarf shrubland, deciduous shrubland, depressional wetland, herby marsh, and montane grassland were not mapped in the footprint of any road relocation.

Source: Montana Natural Heritage Program 2013

Table 8.2-7. Fire Risk in the Right-of-Way of Each Build Alternative by Fire Threat Index Category (acres)

Build Alternative	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	Cat 6	Cat 7	Cat 8	Cat 9	Total
Tongue River	141	2,033	460	388	329	148	98	0	0	3,597
Tongue River East	133	2,481	574	253	166	38	0	0	0	3,645
Colstrip	30	968	271	274	228	110	98	0	0	1,979
Colstrip East	11	1,470	385	140	65	0	0	0	0	2,071
Tongue River Road	173	2,358	560	343	280	117	98	0	0	3,929
Tongue River Road East	165	2,771	675	209	118	7	0	0	0	3,945
Moon Creek	20	2,477	580	294	254	110	98	0	0	3,833
Moon Creek East	13	2,924	694	160	92	0	0	0	0	3,883
Decker	83	1,617	630	210	171	58	0	0	0	2,769
Decker East	84	1,642	637	115	118	46	0	0	0	2,642

Notes:
The Fire Threat Index (FTI) is the fire risk probability of an acre igniting. The FTI is divided into nine classification categories. A lower FTI category indicates a lower probability of an area igniting, and a higher FTI category indicates a higher probability of an area igniting. For simplicity, categories can be grouped to indicate low (Categories 1, 2, 3), moderate (Categories 4, 5, 6), and high fire risk probability (Categories 7, 8, 9).
Source: Oregon Department of Forestry, Western Forestry Leadership Coalition, and Council of Western State Foresters 2012

Tongue River Alternatives

Tongue River Alternative

Construction of the Tongue River Alternative would affect approximately 3,700 acres of vegetation in the right-of-way. Nearly 72 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Approximately 28 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of scrub and dwarf shrubland, deciduous shrubland, herbaceous marsh, and deciduous-dominated forest and woodland. Approximately 78 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 25 acres of vegetation, including agriculture; bluff, badland, and dune; conifer-dominated forest; deciduous-dominated forest and woodland; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 5 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Tongue River Alternative right-of-way has a low probability of wildfire risk, with 73 percent of the acreage identified as Category 1, 2, or 3. Approximately 24 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6), and only 3 percent of the acreage has a high probability of wildfire risk (Category 7).

Tongue River East Alternative

Construction of the Tongue River East Alternative would affect approximately 3,744 acres of vegetation in the right-of-way. Approximately 71 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Approximately 28 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of scrub and dwarf shrubland, herbaceous marsh, and deciduous-dominated forest and woodland. Approximately 54 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 19 acres of vegetation, including agriculture; bluff, badland, and dune; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 2 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Tongue River East Alternative right-of-way has a low probability of wildfire risk, with 87 percent of the acreage identified as Category 1, 2, or 3. Approximately 13 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6). OEA did not identify any right-of-way areas with a high probability of wildfire risk.

Colstrip Alternatives

Colstrip Alternative

Construction of the Colstrip Alternative would affect approximately 1,899 acres of vegetation in the right-of-way. Nearly 64 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Approximately 36 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of deciduous shrubland and deciduous-dominated forest and woodland. Approximately 136 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 30 acres of vegetation, including agriculture; bluff, badland, and dune; conifer-dominated forest; deciduous-dominated forest and woodland; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 9 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Colstrip Alternative right-of-way has a low probability of wildfire risk, with 64 percent of the acreage identified as Category 1, 2, or 3. Approximately 31 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6), and only 5 percent of the acreage has a high probability of wildfire risk (Category 7).

Colstrip East Alternative

Construction of the Colstrip East Alternative would affect approximately 1,978 acres of vegetation in the right-of-way. Nearly 65 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Approximately 35 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of deciduous-dominated forest and woodland vegetation. Approximately 112 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 22 acres of vegetation, including agriculture; bluff, badland, and dune; conifer-dominated forest; deciduous-dominated forest and woodland; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 7 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Colstrip East Alternative right-of-way has a low probability of wildfire risk, with 90 percent of the acreage identified as Category 1, 2, or 3. Approximately 10 percent of the acreage has a moderate probability of wildfire risk (Category 4 or 5; no Category 6). OEA did not identify any right-of-way areas with a high probability of wildfire risk.

Tongue River Road

Tongue River Road Alternative

Construction of the Tongue River Road Alternative would affect approximately 4,100 acres of vegetation in the right-of-way. Approximately 73 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Approximately 27 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of scrub and dwarf shrubland, deciduous shrubland, herbaceous marsh, and deciduous-dominated forest and woodland vegetation. Approximately 128 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 25 acres of vegetation, including agriculture; bluff, badland, and dune; conifer-dominated forest; deciduous-dominated forest and woodland; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 5 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Tongue River Road Alternative right-of-way has a low probability of wildfire risk, with 79 percent of the acreages identified as Category 1, 2, or 3. Approximately 19 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6), and only 2 percent of the acreage has a high probability of wildfire risk (Category 7).

Tongue River Road East Alternative

Construction of the Tongue River Road East Alternative would affect approximately 4,111 acres of vegetation in the right-of-way. Nearly 73 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Approximately 27 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of scrub and dwarf shrubland, herbaceous marsh, and deciduous-dominated forest and woodland vegetation. Approximately 104 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 18 acres of vegetation, including agriculture; bluff, badland, and dune; conifer-dominated forest; deciduous-dominated forest and woodland; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 2 acres of developed land would also be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Tongue River Road East Alternative right-of-way has a low probability of wildfire risk, with 92 percent of the acreage identified as Category 1, 2, or 3. Approximately 8 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6). OEA did not identify any right-of-way areas with a high probability of wildfire risk.

Moon Creek Alternatives

Moon Creek Alternative

Construction of the Moon Creek Alternative would affect approximately 3,953 acres of vegetation in the right-of-way. Approximately 69 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Nearly 31 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of deciduous shrubland and deciduous-dominated forest and woodland vegetation. Approximately 68 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 31 acres of vegetation, including agriculture; bluff, badland, and dune; conifer-dominated forest; deciduous-dominated forest and woodland; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 5 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Moon Creek Alternative right-of-way has a low probability of wildfire risk, with 80 percent of the acreage identified as Category 1, 2, or 3. Approximately 17 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6), and only 3 percent of the acreage has a high probability of wildfire risk (Category 7).

Moon Creek East Alternative

Construction of the Moon Creek East Alternative would affect approximately 3,998 acres of vegetation in the right-of-way. Nearly 69 percent of this impact would consist of lowland prairie/grassland and sagebrush steppe vegetation. Approximately 31 percent of the impact would consist of conifer-dominated forest and woodland; bluff, badland, and dune; agriculture; and floodplain and riparian vegetation. Less than 1 percent of the impact would consist of deciduous-dominated forest and woodland vegetation. Approximately 44 acres of developed land are also in the right-of-way and may be a source of noxious weeds. Road relocations would affect a total of 21 acres of vegetation, including agriculture; bluff, badland, and dune; conifer-dominated forest; deciduous-dominated forest and woodland; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 2 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Moon Creek East Alternative right-of-way has a low probability of wildfire risk, with 94 percent of the acreages identified as Category 1, 2, or 3. Approximately 6 percent of the acreage has a moderate probability of wildfire risk (Category 4 or 5; no Category 6). OEA did not identify any right-of-way areas with a high probability of wildfire risk.

Decker Alternatives

Decker Alternative

Construction of the Decker Alternative would affect approximately 2,753 acres of vegetation in the right-of-way. Approximately 69 percent of this impact would consist of lowland prairie/grassland and conifer-dominated forest and woodland vegetation. Approximately 30 percent of the impact would consist of sagebrush steppe; bluff, badland, and dune; floodplain and riparian; and recently burned vegetation. Less than 1 percent of the impact would consist of agriculture, scrub and dwarf shrubland, herbaceous marsh, and deciduous-dominated forest and woodland vegetation. Approximately 71 acres of developed land and less than 1 acre of mining land are also in the right-of-way and may be sources of noxious weeds. Road relocations would affect a total of 13 acres of vegetation, including bluff, badland, and dune; conifer-dominated forest; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 2 acres of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Decker Alternative right-of-way has a low probability of wildfire risk, with 84 percent of the acreage identified as Category 1, 2, or 3. Approximately 16 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6). OEA did not identify any right-of-way areas with a high probability of wildfire risk.

Decker East Alternative

Construction of the Decker East Alternative would affect approximately 2,634 acres of vegetation in the right-of-way. Nearly 68 percent of this impact would consist of lowland prairie/grassland and conifer-dominated forest and woodland vegetation. Nearly 32 percent of the impact would consist of sagebrush steppe; bluff, badland, and dune; floodplain and riparian; and recently burned vegetation. Less than 1 percent of the impact would consist of agriculture, scrub and dwarf shrubland, herbaceous marsh, and deciduous-dominated forest and woodland. Approximately 60 acres of developed land and less than 1 acre of mining land are also in the right-of-way and may be sources of noxious weeds. Road relocations would affect a total of 14 acres of vegetation, including bluff, badland, and dune; conifer-dominated forest; floodplain and riparian; lowland prairie/grassland; and sagebrush steppe vegetation. Approximately 1 acre of developed land would be affected by road relocations and may be a source of noxious weeds.

The FTI indicates that most of the Decker East Alternative right-of-way has a low probability of wildfire risk, with 89 percent of the acreage identified as Category 1, 2, or 3. Approximately 11 percent of the acreage has a moderate probability of wildfire risk (Category 4, 5, or 6). OEA did not identify any right-of-way areas with a high probability of wildfire risk.

8.2.4.3 No-Action Alternative

Under the No-Action Alternative, TRRC would not construct or operate the proposed Tongue River Railroad, and there would be no impacts on vegetation from construction or operation of the proposed rail line.

8.2.4.4 Mitigation and Unavoidable Environmental Consequences

To avoid or minimize the environmental impacts on vegetation from the proposed rail line, OEA is recommending that the Board impose seven mitigation measures, including two measures volunteered by TRRC (Chapter 19, Section 19.2.5, *Biological Resources*). These measures would require TRRC to restore disturbed areas with a reclamation plan approved by appropriate agencies, comply with weed controls developed for Rosebud, Big Horn, Custer, and Powder River Counties (Montana), submit a wildfire management plan, implement measures to minimize fugitive dust and reduce runoff and erosion, begin revegetation as soon as possible or implement alternative stabilization measures, minimize the introduction and spread of noxious weeds, and implement a fire prevention plan.

Even with the implementation of OEA's recommended mitigation measures and TRRC's voluntary measures, construction and operation of the proposed rail line would cause unavoidable impacts on vegetation. These impacts could include permanent loss of vegetation, constraints to plant germination and growth, the spread of noxious weeds, alternated plant growth from dust deposition and maintenance, increased risk of wildfires, and alteration of riparian vegetation. Because the common vegetation species populations addressed in this section are secure and not vulnerable to decline, OEA concludes that these adverse impacts would be a minor. For wildfires, wildfire risk along any build alternative would be low. OEA concludes that this adverse impact would be minor. However, areas along the Tongue River Alternatives, Colstrip Alternatives, Tongue River Road Alternatives, and Moon Creek Alternatives would have higher wildfire risks. OEA concludes that these adverse impacts would be moderate.

8.3 Wildlife

This section describes the impacts on wildlife that would result from construction and operation of each of the build alternatives. The subsections that follow describe the wildlife study area, the methods used to analyze wildlife impacts, the affected environment, and the impacts of the build alternatives on wildlife. The regulations and guidance related to wildlife are summarized in Section 8.6, *Applicable Regulations*. Appendix J, *Wildlife Resources and Special-Status Species*, provides further data regarding wildlife species and assessment methods. The contribution of the proposed rail line to cumulative impacts on wildlife is discussed in Chapter 18, *Cumulative Impacts*.

Species addressed in this section are considered common; populations are secure and not vulnerable to decline. Species or populations that are designated as at risk or declining are defined as special-status species. These species include federally threatened and endangered species; U.S. Department of the Interior, Bureau of Land Management (BLM) sensitive species; and Montana Fish, and Wildlife & Parks (Montana FWP) species of concern. Forty-seven of the 285 wildlife species in the study area are special-status wildlife species (Table 8.3-1). For information regarding these species, see Section 8.5, *Special-Status Species*.

In summary, OEA determined that 285 wildlife species use habitats in the study area (Appendix J, *Wildlife Resources and Special-Status Species*, Table J-4). Construction and operation of the proposed rail line could increase mortality, create a barrier to movement, displace species, change species composition, and cause habitat loss, degradation, and alteration. The Tongue River Road Alternatives and Moon Creek Alternatives, as the longest of the build alternatives, would affect the greatest number of acres of wildlife habitat. The Colstrip Alternatives, as the shortest of the build alternatives, would affect the fewest acres. The Tongue River Road Alternatives would affect the greatest number of wildlife species and *taxa*[1] groups, followed by the Tongue River Alternatives and Moon Creek Alternatives. The Colstrip Alternatives and Decker Alternatives would affect the fewest wildlife species and taxa groups. Affected wildlife species are secure and not vulnerable to decline, and OEA concludes that adverse impacts would be minor.

[1] Terms italicized at first use are defined in Chapter 25, *Glossary*.

Table 8.3-1. Special-Status Wildlife Species That Could Occur in the Study Area

Mammals		
Black-footed ferret	Fringed myotis	Swift fox
Black-tailed prairie dog	Hoary bat	Townsend's big-eared bat
Birds		
Alder fly-catcher	Common loon	Mountain plover
American bittern	Evening grosbeak	Peregrine falcon
American white pelican	Ferruginous hawk	Pinyon jay
Back-billed cuckoo	Franklin's gull	Red-headed woodpecker
Baird's sparrow	Golden eagle	Sage thrasher
Bald eagle	Great blue heron	Sagebrush sparrow
Bobolink	Greater sage-grouse	Sprague's pipit
Brewer's sparrow	Green-tailed towhee	Veery
Burrowing owl	Interior least tern	Whooping crane
Cassin's finch	Lewis's woodpecker	Yellow-billed cuckoo
Chestnut-collared longspur	Loggerhead shrike	
Clark's grebe	Long-billed curlew	
Reptiles and Amphibians		
Great plains toad	Plains spadefoot	Western hog-nosed snake
Greater short-horned lizard	Snapping turtle	
Milksnake	Spiny softshell	

8.3.1 Study Area

OEA defined four study areas for wildlife, each specific to a different wildlife group. Each study area includes the right-of-way of each build alternative plus the area within 0.5 mile, 1 mile, 2 miles, or 4 miles from the edge of the right-of-way. OEA surveyed smaller species, such as amphibians and reptiles, out to 0.5 mile and medium-sized mammals and bird species out to 1 mile. OEA surveyed larger species, such as big game and raptors, out to 2 miles. OEA surveyed known sharp-tailed grouse (*Tympanuchus phasianellus*) *leks* (i.e., specific locations where males congregate to compete for females) out to 4 miles. OEA based all study areas on established agency protocols and modified them with the assistance of federal and state entities to provide the best information on local wildlife populations in a specific area while accounting for wildlife movement and *home ranges*. The largest study area is the 4-mile study area (881,732 acres); all other study areas are contained within this study area.

8.3.2 Analysis Methods

OEA used the following methods to evaluate wildlife in the study area and determine the impacts of construction and operation of the build alternatives on wildlife.

8.3.2.1 Literature Search and Consultation

OEA reviewed published wildlife studies and data from various agencies to document what is known about wildlife populations in southeast Montana and in the study area. Based on this review, OEA developed a study plan for wildlife surveys and methods. OEA presented the study plan to agencies and entities with knowledge of regional wildlife, including representatives from the following agencies:

- Montana Department of Natural Resource Conservation
- Montana Natural Heritage Program
- U.S. Department of Agriculture—Fort Keogh Livestock and Range Research Laboratory (Fort Keogh)
- U.S. Fish and Wildlife Service (USFWS)—Montana Ecological Services Field Office, Helena, MT
- Bureau of Land Management—Miles City Field Office
- U.S. Department of Agriculture, Forest Service (USFS)—Ashland Ranger District
- Montana FWP
- Northern Cheyenne Tribe

The consulted agencies and entities provided regional information pertaining to wildlife populations in southeastern Montana and informed OEA's revisions to the study plan. USFWS, BLM, Montana FWP, and the Montana Natural Heritage Program approved OEA's proposed methods for aerial and ground surveys. The corresponding BLM and Montana FWP management boundaries that the study area overlaps include the BLM – Miles City Field Office and Montana FWP Region 7 hunting districts 702 and 704 (hereafter collectively referred to as the region). It is important to note that wildlife population levels within the region were looked at and comparisons were made between populations at the regional level to what was documented within the study area because wildlife species are mobile and have the potential to move in and out of areas.

The Montana Natural Heritage Program provides information on Montana's wildlife species and maintains a long-term data set to track these species throughout the state. The Montana Natural Heritage Program compiles and manages data made available from federal and state agency personnel, private consultants, museum specimens, published and unpublished scientific literature, and field surveys. This program does not provide a complete list of all species in a given area because it relies heavily on survey work conducted by other entities. The data set does not cover all areas, especially private lands, unless permission was granted for a specific purpose. However, because the data set spans approximately 40 years, it may capture uncommon or rare species that could be missed during annual survey work because of the species' low frequency of occurrence. OEA used data from this program to determine the historical occurrence and current populations of wildlife in the study area.

8.3.2.2 Surveys

OEA conducted baseline surveys, including 10 taxa-specific surveys, between January and September 2013. Taxa-specific surveys are designed to collect detailed information for a specific wildlife group. OEA conducted winter aerial surveys for mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and antelope (*Antilocapra americana*). OEA conducted spring aerial surveys for sharp-tailed grouse (lek counts and searches) and raptors (nest monitoring and searches). OEA conducted spring and summer ground surveys for sharp-tailed grouse lek (counts and searches) and raptors (nest monitoring and searches) and diurnal (daytime) and nocturnal (nighttime) breeding-bird point counts, nocturnal amphibian call surveys, targeted amphibians and reptiles searches, and bat monitoring. Baseline surveys provided data to describe populations in the study area. The analyses included herd numbers, density, abundance index, and species richness. *Density* refers to the number of individuals observed per survey per square mile of the study area. An *abundance index* is an average number of individuals detected during baseline surveys per survey. A higher index number indicates that more individuals were present in the study area. *Species richness* refers to the total number of species detected in the study area. In addition to baseline surveys, OEA recorded all incidental observations of wildlife between January and September 2013.

OEA used aerial and ground methods to cover the entire study area in 2013. Specifically, OEA conducted aerial surveys of the entire 4-mile study area (881,732 acres) and ground surveys of the 2-mile study area (485,150 acres) where OEA was able to obtain permission to access the area from landowners. OEA put substantial effort into obtaining permission to access lands along the right-of-way of each build alternative (Appendix B, *Land Access*). The 2-mile wildlife study area was 485,150 acres; OEA was permitted to access 206,446 acres (43 percent) of the 2-mile study area. Of these 206,446 acres, OEA actually surveyed 162,632 acres (79 percent of the acres with permitted access). OEA did not access 43,814 acres (21 percent of acres with permitted access) for the following reasons:

- Isolated parcels were surrounded by inaccessible parcels with no public roads for access (18,725 acres, or 9 percent of the permitted access area). These areas were primarily public lands, including state lands and BLM-administered lands.
- Parcels were temporarily inaccessible because of poor road conditions, resulting from spring and summer flooding (2,542 acres, or 1 percent of the permitted access area).
- Parcels were temporarily inaccessible because of an active coal seam fire (7 acres, or less than 0.01 percent of the permitted access area).
- A sufficient representative sample had been collected per the wildlife study plan, and OEA saw no need to access the remaining areas to collect additional data (22,547 acres, or 11 percent of the permitted access area). No unique habitat features exist in these areas, and existing habitats are similar to surrounding areas that were surveyed in 2013.

At the end of the 2013 baseline survey period, OEA met with representatives from the USFWS, BLM, and Montana FWP to review all data collected. No gaps in data were identified during the meeting. The parties agreed that enough data were collected to perform the wildlife analysis in this Draft EIS and that no additional wildlife surveys were warranted.

8.3.2.3 Impact Determination

OEA assumed that the entire right-of-way would be disturbed during rail construction (i.e., from clearing, excavation, and placement of fill material). Some areas would be permanently disturbed (i.e., the rail line footprint), and some areas would be temporarily disturbed. It is unlikely the entire right-of-way would be disturbed during construction; the exact locations of permanent and temporary disturbance within the right-of way would be determined during final design. Therefore, OEA's assumption that the entire right-of-way would be disturbed most likely overestimates the actual impacts. To assess the impacts on wildlife and habitats, OEA overlaid historical data, baseline survey data, and species' ranges on the rights-of-way in the geographic information system (GIS) model that was used to calculate the number of acres of lost habitat quantitatively and the number of species or taxa in the rights-of-way and study area that could be affected.

With the exception of road relocations and support facilities (i.e., communication towers, power distribution lines, and support buildings), construction of any build alternative would not remove vegetation outside of the right-of-way. The exact locations of the support facilities would be determined during final design. Some road relocations would occur adjacent to the right-of-way; these impacts have been included in the analyses. Where appropriate, road relocation impacts have been quantified and included with the right-of-way impacts. Also, impacts from construction and operation in the right-of-way could extend to wildlife outside of the right-of-way. These types of impacts are described below, and, where appropriate, quantitative data (e.g., number of nests, species densities) are provided.

8.3.3 Affected Environment

Topography varies throughout the study area. Elevations range from 2,360 to 4,130 feet. Lower elevations occur in the northern parts of the study area, with increasing elevations southward. Badland topography, or barren land characterized by roughly eroded ridges, peaks, and mesas with no to sparse vegetation, characterizes the northern and northwestern parts of the study area. Gently rolling hills dominate the study area between Ashland and Foster Creek Road (approximately 35 miles north of Ashland along Tongue River Road). Steeper hills and higher elevations occur between Colstrip and Ashland. Open plains with exposed sandstone outcrops are present east of Colstrip. Steep hills leading to plateaus, interspersed with wide valleys, dominate the study area southward to Decker.

The five major habitat types in the study area are summarized as follows:

- **Riparian habitat** occurs primarily along the Tongue River and major and some minor tributaries. This habitat consists of cottonwood (*Populus* spp.), green ash (*Fraxinus*

pennsylvanica), and box elder (*Acer negundo*), with a willow (*Salix* spp.), chokecherry (*Prunus virginiana*), western snowberry (*Symphoricarpos occidentalis*), Osage orange (*Maclura pomifera*), buffaloberry (*Shepherdia* spp.), and wild rose (*Rosa* spp.) understory. Large swaths of riparian habitat occur at the confluence of the Tongue River and Yellowstone River and just north of Ashland. Isolated patches of riparian habitat occur along the major tributaries of the Tongue River, with small stands of cottonwood, green ash, and willow. Riparian habitat is also present along Rosebud Creek in the central western part of the study area. Riparian habitat is a small component of the southern part of the study area, occurring in small patches along the Tongue River and along some of the minor tributaries.

- **Grasslands** are widespread and interspersed with shrublands and woodlands. Grasslands occur in the floodplain and gentler terrain. Small, isolated grasslands occur at the higher elevations in the southern part of the study area. Common species include western wheatgrass (*Elymus smithii*), bluebunch wheatgrass (*Elymus spicatus*), little bluestem (*Schizachyrium scoparium*), needle and thread (*Stipa comata*), side-oats grama (*Bouteloua curtipendula*), smooth brome (*Bromus inermis*), great basin wildrye (*Elymus cinereus*), and cheat grass (*Bromus tectorum*).
- **Shrublands** occur throughout the study area and are intermixed with grasslands and woodlands. Shrublands consist primarily of silver sagebrush (*Artemisia cana*) and black greasewood (*Sarcobatus vermiculatus*) in the low-lying areas and big sagebrush (*Artemisia tridentata*) and saltbush (*Atriplex* spp.) in the upland areas.
- **Woodlands** are found at higher elevations and along canyons and cliffs. Sparse woodlands are found in the badland topography in the northern and northwestern parts of the study area. They also occur at higher elevations between Ashland and Colstrip and dominate the southern part of the study area. Woodlands consist primarily of ponderosa pine (*Pinus ponderosa*). Juniper (*Juniperus scopulorum*) groves occur on lower slopes and at lower elevations.
- **Agricultural fields** dominate the floodplain along the Tongue River and the major tributaries. Agricultural fields consist of alfalfa hay meadows, mixed-grass hay fields, corn, sorghum, wheat, and barley.

In 2012, three fires occurred in the study area between Brandenberg and Ashland. The Big John, Sand Creek, and Ash Creek fires burned a combined 269,984 acres; 114,933 acres overlapped 13 percent of the 4-mile wildlife study area (U.S. Forest Service 2013). Fires in this ecosystem can release nutrients back into the ground and stimulate germination and growth in plant communities. Habitat changes in the study area were varied and depended on the severity of the fire in that location. In the burned areas, most woodland was completely lost (i.e., all trees, shrubs, and grasses were destroyed). Pockets of ponderosa pine and juniper trees survived the burns in the more rugged and rocky terrain. Riparian structure along the Tongue River was almost all lost; however, in late summer, rejuvenation and colonization were evident. Because precipitation was at or above average in the spring and

summer of 2013, wildflowers and grasses were abundant in burned areas, and sprouts were seen at the base of many burned cottonwoods.

Two conservation easements in the study area were established for the primary purpose of protecting riparian habitat, sagebrush grasslands, and plains forest as well as improving and maintaining the productivity and quality of the land, water, and vegetation to meet the needs of wild and domestic animals. Conservation easements are a legal agreement between a landowner and a land trust (in this case, Montana FWP). The purpose of a conservation easement is to preserve the following land uses.

- Open space, including farmland, ranchland, and forestland.
- Relatively natural habitat for wildlife, fish, and plants.
- Land for educational or outdoor recreation for the public.

These agreements limit the landowner's ability to develop the property, leaving habitats intact for wild and domestic animals, and allow the land trust (e.g., Montana FWP) to monitor the property and ensure that the stated goals of the easement are being met. The wildlife-specific goals of the conservation easements are to improve antelope, mule deer, white-tailed deer, and greater sage-grouse winter ranges; nesting and brood-rearing habitats for sharp-tailed grouse, greater sage-grouse, and wild turkey; and summer habitat for those species previously mentioned as well as many nongame birds and mammals.

The Bice/Hirsch Ranches Conservation Easements are located approximately 30 miles south of Miles City and consist of 26,174 acres, of which 16,420 acres overlap the study area. These areas are adjacent to the Tongue River Ranch, which the Montana Department of Natural Resource Conservation purchased to increase public access to public lands for hunting and fishing. The Tongue River Ranch provides habitats for mule deer, white-tailed deer, antelope, greater sage-grouse, sharp-tailed grouse, pheasants, wild turkeys, raptors, and songbirds. Montana FWP actively monitors habitats and wildlife on Montana FWP easements in these areas to ensure that the stated goals are being met.

8.3.3.1 Mammals

Big Game

Big game animals in the study area include large ungulates (any animal with hooves) and large predators that are managed by Montana FWP (Montana Code Annotated [MCA] Title 87, *Fish and Wildlife*). State regulations define 10 animals in Montana as big game (MCA 87-6-101). The Montana Natural Heritage Program (2013a, 2013b) has documented eight big game species in the study area: antelope, bighorn sheep (*Ovis canadensis*), black bear (*Ursus americanus*), deer (mule deer and white-tailed deer), elk (*Cervus canadensis*), gray wolf (*Canis lupus*) and mountain lion (*Puma concolor*). OEA documented five big game species during 2013 baseline surveys: elk, mule deer, antelope, white-tailed deer, and mountain lion.

Big game is managed by Montana FWP under various management plans, with the primary purpose of maintaining healthy populations at levels that habitats can support and within landowner tolerance. One aspect of the management plans is the designation of high-value habitats, which are crucial for maintaining populations of certain species. In the study area, only mule deer, white-tailed deer, and antelope have habitats that are classified as crucial (Montana Fish, Wildlife & Parks 2013a, 2013b, 2013c). The remaining species do not have crucial habitat designations in the study area, and species occurrence is low.

Mule deer, white-tailed deer, and antelope have habitats that are classified as high-value winter range, which is defined as providing the necessary resources to contribute to over-winter adult survival. Resources include quality forage, consisting of grasses and shrubs. For large ungulate species, these habitats can vary but generally depend on shallow snow depths (Mackie et al. 1998). Approximately 215,516 acres (44 percent of the 2-mile study area) provide high-value mule deer winter range, approximately 257,026 acres (53 percent of the 2-mile study area) provide high-value white-tailed deer winter range, and approximately 23,707 acres (5 percent of the 2-mile study area) provide high-value antelope winter range (Montana Fish, Wildlife & Parks 2013a, 2013b, 2013c).

No designated migration corridors are in the study area, and populations in the region are considered resident. Big game populations do not migrate in the study area. Herds do move between habitats in the region, but they do not move long distances in response to seasonal changes (Bureau of Land Management 2013a, Farmer 2012, Mackie et al. 1998, Martin 1980).

The mule deer population has recently declined in the region;[2] however, the noted decline is within normal population fluctuation and can be attributed to environmental factors (Bureau of Land Management 2013a). The current 10-year average estimates mule deer populations in the region at 56,480 individuals (Montana Fish, Wildlife & Parks 2013d). During 2013 baseline surveys, OEA routinely documented mule deer in sage or sage-grassland habitats but also observed deer regularly in woodland habitats. During winter aerial surveys, OEA recorded approximately 117 herds, with an average of 7.2 individuals per herd, and calculated density at 1.1 individuals per square mile. These numbers are comparable to other studies in the Tongue River valley (Farmer 2012; Martin 1980).

White-tailed deer populations in the region have remained fairly constant, with little fluctuation (Bureau of Land Management 2013a). The current 10-year average estimates the regional white-tailed deer population at 11,887 individuals (Montana Fish, Wildlife & Parks 2013e). During 2013 baseline surveys, OEA documented white-tailed deer throughout the Tongue River riparian corridor and in nearby hay fields. During winter aerial surveys, OEA recorded approximately 54 herds, with an average of 9.5 individuals per herd, and calculated density at 0.7 individual per square mile.

[2] The term *region* in the context of species populations and herds pertains specifically to the southern portion of the BLM – Miles City Field Office jurisdictional area and Montana FWP hunting districts 702 and 704.

Antelope populations in the region have increased over the last 3 years. The 2013 population estimate in the region was 38,368 individuals (Montana Fish, Wildlife & Parks 2011, 2012, 2013f). During 2013 baseline surveys, OEA documented antelope throughout sage-grassland and grassland habitats. During winter aerial surveys, OEA recorded approximately 31 herds, with an average of 21.2 individuals per herd, and calculated density at 0.9 individual per square mile.

Furbearers

Furbearers include mammals regulated by Montana FWP for trapping. State regulations classify 10 mammal species as furbearers: marten or sable, otter, muskrat, fisher, mink, bobcat, lynx, wolverine, northern swift fox, and beaver (MCA 87-6-101). The Montana Natural Heritage Program (2013a, 2013b) has documented mink (*Mustela vison*), beaver (*Castor canadensis*), bobcat (*Lynx rufus*), and muskrat (*Ondatra zibethicus*) in the study area. OEA also documented beaver, bobcat, and muskrat in the study area during the 2013 baseline surveys. Populations of these species are stable throughout their ranges and widespread throughout the study area.

Beavers are common along the Tongue River and were documented along Moon Creek during 2013 baseline surveys. Bobcats are also common and have been documented throughout the study area, in habitats ranging from grasslands to woodlands. The remaining documented species occur in low numbers but are present in the study area.

For swift fox, see Section 8.5, *Special-Status Species.*

Nongame Mammals

Management of nongame mammals is the responsibility of Montana FWP, per MCA 87-5, *Wildlife Protection*. Nongame mammals include any wild mammal "not otherwise legally classified by statue or regulation" and are managed by Montana FWP, with the intent to conserve populations consistent with other uses of the land and habitats (MCA 87-5-102(5)). Nongame mammals are extremely diverse and include, but are not limited to, mice, shrews, voles, rabbits, skunks, red fox (*Vulpes vulpes*), and coyote (*Canis latrans*). The Montana Natural Heritage Program (2013a, 2013b) has documented 31 nongame mammal species in the study area (Appendix J, *Wildlife Resources and Special-Status Species*). OEA recorded 22 species during 2013 baseline studies (Appendix J, *Wildlife Resources and Special-Status Species,* Table J-4).

8.3.3.2 Birds

Raptors

Habitat features in the study area provide a variety of resources for raptors (birds of prey) throughout the year. Roosting and nesting substrates include mature trees, cliffs, ridgelines, and tree and rock cavities. Foraging areas include fish-bearing rivers and prairie dog

colonies as well as various habitats that sustain small-mammal, reptile, and amphibian populations. Hunting perches are widely available and include fence posts, trees, power poles, cliffs, high ridgelines, and rock outcrops.

Various raptor species use the Tongue River valley and surrounding habitats for wintering, breeding, and migration. The Montana Natural Heritage Program (2013a, 2013b) and BLM (2013b) have documented 15 raptor species in the study area (Appendix J, *Wildlife Resources and Special-Status Species*, Table J-4); however, only seven are known to breed in the study area. Raptor species with documented nesting attempts in the study area are the American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), osprey (*Pandion haliaetus*), prairie falcon (*Falco mexicanus*), and red-tailed hawk (*Buteo jamaicensis*). For special-status raptor species, see Section 8.5, *Special-Status Species.* The great horned owl (*Bubo virginianus*), northern harrier (*Circus cyaneus*), rough-legged hawk (*Buteo lagopus*), and red-tailed hawk (*Buteo jamaicensis*) occur in the study area during winter months. The rough-legged hawk is present only during winter because its breeding range is in the arctic tundra. Great horned owls are year-round residents in the study area; however, a subset of this population is migratory. Northern harrier and red-tailed hawk are present during the breeding season, and a small subset of the populations remains in parts of Montana during the winter.

OEA documented 143 nests for non-special-status raptor species in the study area in 2013 (Section 8.3.4.2, *Impacts by Build Alternative*). OEA marked 64 percent of those nests as *unknown*, meaning a raptor nest is present, but no raptor species have been recorded using it. Red-tailed hawks were the most common nesting species in the study area (56 percent of active nests; 20 percent of total nests). OEA determined that 32 nests were active among seven different species in 2013; of these, eight nests were successful, and seven failed. OEA did not observe fledglings, eggshells, destroyed nests, or dead young at any of the remaining 17 nests and could not determine if they were successful or failed nests.

Upland Game Birds

Upland game birds (sharp-tailed grouse, blue grouse, spruce [Franklin] grouse, prairie chicken, sage hen or sage grouse, ruffed grouse, ring-necked pheasant, Hungarian partridge, ptarmigan, wild turkey, and chukar partridge) are regulated by Montana FWP to maintain sustainable populations. The Montana Natural Heritage Program (2013a, 2013b) has documented four upland game bird species in the study area: Hungarian partridge (*Perdix perdix*), ring-necked pheasant (*Phasianus colchicus*), sharp-tailed grouse, and wild turkey (*Meleagris gallopavo*). All four were documented during the 2013 baseline surveys. For information on the greater sage-grouse, see Section 8.5, *Special-Status Species.*

Sharp-tailed grouse was the most common documented upland game bird species. This species is associated with dense herbaceous cover with complex vegetative structure, including a mix of grasses, shrubs, and forbs. Habitat features include small grasslands or the sparse, short vegetation found in more complex habitat structures, such as shrubland and

woodland. The study area provides excellent habitat for sharp-tailed grouse, which are abundant. Of the 135 known sharp-tailed grouse leks, 32 leks were active in 2013. OEA documented five new leks and one potential lek in 2013. These leks were located where no previous observation existed in Montana FWP records. Peak male counts at the leks ranged from one to 26 displaying males (Section 8.3.4.2, *Impacts by Build Alternative*).

Ring-neck pheasants and wild turkeys were also fairly common but only in riparian and adjacent agricultural fields. Gray partridges were uncommon in the study area. All three species are considered nonnative species by Montana FWP and were introduced into the state during the early 1900s.

Migratory Game Birds

Montana FWP regulates harvesting activities of migratory game birds. The species are primarily ducks and geese. The Montana Natural Heritage Program (2013a, 2013b) documented the American coot (*Fulica Americana*), blue-winged teal (*Anas discors*), Canada goose (*Branta Canadensis*), common goldeneye (*Bucephala clangula*), common merganser (*Mergus merganser*), gadwall (*Anas strepera*), hooded merganser (*Lophodytes cucullatus*), mallard (*Anas platyrhynchos*), mourning dove (*Zenaida macroura*), northern shoveler (*Anas clypeata*), ruddy duck (*Oxyura jamaicensis*), sandhill crane (*Grus Canadensis*), and wood duck (*Aix sponsa*) in the study area. OEA recorded 21 species during the 2013 baseline surveys (Appendix J, *Wildlife Resources and Special-Status Species,* Table J-4). Canada geese, mallard, and mourning doves (*Zenaida macroura*) were the most commonly recorded species.

Nongame Birds

Montana FWP manages nongame birds per MCA 87-5, *Wildlife Protection*. Nongame birds include any bird "not otherwise legally classified by statue or regulation" and are managed with the intent of conserving populations consistent with other uses of the land and habitats (MCA 87-5-102(5)). The Montana Natural Heritage Program (2013a, 2013b) has documented 19 species that are classified as shorebirds, wading birds, loons, grebes, pelicans, or other water birds in the study area (Appendix J, *Wildlife Resources and Special-Status Species,* able J-4). OEA documented 12 of these species and an additional three shorebirds and two gull species during the 2013 baseline surveys.

The Montana Natural Heritage Program (2013a, 2013b) also includes 113 terrestrial or upland bird species in 22 groups, including woodpeckers, flycatchers, vireos, thrushes, warblers, and sparrows, that have been recorded throughout the study area (Montana Natural Heritage Program 2013a, 2013b). OEA documented 98 species across the same 22 groups during the 2013 baseline surveys (Appendix J, *Wildlife Resources and Special-Status Species,* Table J-4).

Avian Communities

To provide a comprehensive picture of bird communities in the study area, OEA conducted diurnal (daytime) and nocturnal (nighttime) point-count surveys across all major habitat types in proportion to availability during the 2013 baseline surveys. OEA then calculated bird species abundance and richness and compiled the data for each habitat type (Table 8.3-2). OEA recorded 90 species during diurnal point surveys and 41 species during nocturnal point surveys. Overall, the nocturnal species list is comparable to the diurnal list; however, common nighthawks (*Chordeiles* minor), yellow-breasted chat (*Icteria virens*), eastern screech owl, and common poorwill (*Phalaenoptilus nuttallii*) were more frequent during nocturnal surveys. Relative abundance was highest in riparian habitats, with the second-highest abundance occurring in agricultural fields. Burned woodlands had a higher abundance than unburned plots. Grasslands had the lowest abundance. Also, unburned woodland habitat roadside plots had significantly higher species richness, and roadside agricultural field plots had significantly higher abundances (Table 8.3-2).

Table 8.3-2. Avian Community Species Richness and Abundance in the Five Major Habitat Types in the Study Area

Habitat Type	Species Richness[a]	Species Abundance[b]
Grassland	44	8.75
Shrubland	39	9.73
Woodland	59	10.00
Burned woodland	40	10.98
Unburned woodland	51	9.33
Agricultural field	51	11.00
Riparian	72	14.28

Notes:
[a] Richness = total number of species recorded during diurnal point-count surveys in the 1-mile study area.
[b] Abundance = total number of birds detected during diurnal point-count surveys in the 1-mile study area divided by the number of times surveyed.

For special-status species bird abundance and richness, see Section 8.5, *Special-Status Species.*

8.3.3.3 Reptiles and Amphibians

Reptiles

The Montana Natural Heritage Program (2013a, 2013b) has documented seven species of reptiles in the study area: five snakes, one turtle, and one lizard. OEA documented six species of reptiles in the study area during the 2013 ground surveys: the gophersnake (*Pituophis catenifer*), eastern racer (*Coluber constrictor*), plains gartersnake (*Thamnophis radix*), prairie rattlesnake (*Crotalus viridis*), rubber boa (*Charina bottae)*, and painted turtle (*Chrysemys picta*) (Appendix J, *Wildlife Resources and Special-Status Species,* Table J-4).

Amphibians

The Montana Natural Heritage Program (2013a, 2013b) has documented four species of amphibians in the study area: the barred tiger salamander (*Ambystoma mavortium*), boreal chorus frog (*Pseudacris maculata*), the northern leopard frog (*Lithobates pipiens*), and Woodhouse's toad (*Anaxyrus woodhousii*). OEA recorded four amphibian species in the study area during the baseline surveys in 2013: the boreal chorus frog, northern leopard frog, American bullfrog (*Lithobates catesbeianus*), and Woodhouse's toad.

OEA conducted nocturnal call surveys in the summer of 2013 to assess amphibian populations in the study area. A call survey records those species that were heard calling for a set period and at specific locations. OEA conducted call surveys at various water features in proportion to the availability of habitat throughout the study area. OEA calculated abundance indices for most amphibian species that were documented. The boreal chorus frog was most abundant (3.86) and seen commonly throughout the study area. The Woodhouse's toad was the second-most abundant (0.76). The American bullfrog was least abundant (0.04) and noted only in a few isolated locations in the study area.

8.3.4 Environmental Consequences

Impacts on wildlife would result from construction and operation of any build alternative. The impacts common to all build alternatives are presented first, followed by impacts specific to the build alternative.

For impacts on species listed under the federal Endangered Species Act (ESA) and other species of concern, refer to Section 8.5, *Special-Status Species.*

8.3.4.1 Impacts Common to All Build Alternatives

Construction

Both temporary and permanent impacts would result from construction-related activities such as land clearing in the right-of-way, relocating roads, extracting and disposing soil related to cut-and-fill needs, constructing the railbed, laying rail line, and installing associated facilities (e.g., power lines and fences). Construction impacts on wildlife that are common to all build alternatives are listed below. The intensity of the impact would vary, depending on the habitat affected and the species that are dependent on that habitat.

- **Result in an Increase in Mortality Rates**

  Construction of the proposed rail line would increase the mortality of wildlife species, resulting from construction-related collisions with wildlife and the inability of wildlife to escape land-clearing activities. Higher mortality rates would occur where the density of individuals is higher.

- **Result in Habitat Loss**

  Construction of the proposed rail line would remove vegetation, resulting in permanent habitat loss in the right-of-way and in areas needed for road relocations. The specific habitats that would be affected are high-value winter range for big game, foraging and refuge sites across all major wildlife habitats, and raptor perches, roost sites, and nest sites.

- **Result in Habitat Degradation**

  Construction of the proposed rail line would degrade habitat because of increased noise and dust levels. Dust would affect the quality of forage, and higher noise levels would cause species to avoid or expend more energy in louder areas.

- **Result in Habitat Alteration**

  Construction of the proposed rail line would alter wildlife habitats. Land-clearing activities and subsequent revegetation of the right-of-way would change vegetation communities from their current habitat types (especially in more complex habitat types such as shrubland, woodland, and riparian habitats) to grassland. Also, increased disturbance of the vegetation communities may lead to the colonization of invasive species. Land-clearing activities would create a habitat edge (i.e., an abrupt change in habitat type), which could change wildlife species composition because some species avoid edges and others seek out edge habitats. The habitat edge would also most likely decrease reproductive output for specialist species that require contiguous blocks of more complex (e.g., woodland) habitat.

  Construction of the proposed rail line could also alter habitat to the benefit of some raptor species by providing infrastructure that could be used as hunting perches and nest sites. The greater edge-to-area ratios would also provide larger movement corridors for predators.

- **Displace Wildlife**

  Construction of the proposed rail line would displace wildlife by increasing noise levels and human presence. This displacement could reduce survival and productivity because displacement requires species to expend energy to locate replacement habitat, which may have fewer resources and be of a lower value. Lower value habitats might include areas where forage is not as nutritious or forage and refuge are not as available. Wildlife would be less familiar with new areas and at greater risk of predation, thus limiting survival of offspring or adults. Construction noise and human activity could cause adults to abandon the area to the demise of young, especially nearby nesting raptors. Also, an increase in visible infrastructure would cause displacement because some species would avoid areas within line-of-sight of infrastructure.

- **Create Barriers to Movement**

  Construction of the proposed rail line would prevent smaller species, such as voles, mice, and amphibians, from crossing the affected area. Large species would be physically able to cross affected areas or move around the disturbance, but their perception of a barrier (fragmented habitat with ongoing disturbance and the presence of artificial structures) could still prevent them from crossing the right-of-way. This barrier would impede immigration and emigration for some species, which could affect species gene flow.

- **Change the Species Composition**

  Construction of the proposed rail line would change species composition in the study area. Certain species would avoid or move farther away from increased disturbance and associated habitat changes, and other species would move toward the disturbance and associated habitat changes. Species with the ability to use simple or disturbed habitats would be found closer to the right-of-way, and other species with a strict habitat requirement or affinity for undisturbed or specialized habitats would be found farther away from the right-of-way.

Operation

Temporary and permanent impacts on wildlife could occur during operation of the proposed rail line because of increased noise from train traffic and maintenance activities, changes in fire regime, potential spills and leaks of petrochemicals or other toxic substances used for maintenance, and vegetation maintenance (physical and chemical) in the right-of-way. The number of trains on the proposed rail line would be 7.4 per day under the low coal production scenario, but could be as high as 26.7 per day under the high coal production scenario.[3] The number of trains per day would not change the types of impacts on wildlife, but it could affect the level or intensity of the impact (e.g., more trains could result in increased maintenance activities or an increase in incidental discharges of pollutants).

- **Result in an Increase in Mortality Rates**

  Operation of the proposed rail line could increase mortality of wildlife species because of collisions with trains and maintenance equipment and increased predation risk. Higher mortality rates would occur where the density of wildlife is higher. Species that feed on carrion (flesh of dead animals), use the rail line right-of-way as a movement corridor, or use habitats adjacent to the rail line would have an increased incidence of collision mortality. Collision mortality would most likely increase in winter under deep-snow conditions when wildlife would use the cleared rail line and right-of-way as a movement

[3] The coal production scenarios (low, medium, high) reflect different levels of rail traffic, depending on which build alternative is licensed, which mines are induced or developed, and the production capacities of those mines. The coal traffic scenarios are described in Appendix C, *Coal Production and Markets.* The related rail traffic is summarized in Chapter 2, Section 2.3.3, *Rail Traffic*.

corridor or a forage area. Associated infrastructure would also cause increased mortality rates because the number of wildlife collisions with power lines, communication towers, and fences would increase. Operation impacts could disrupt predator-prey relationships in the short term. As species adapt to disturbances associated with operation, predator-prey relationships would stabilize.

- **Result in Habitat Fragmentation**

The proposed rail line would result in habitat fragmentation by splitting large areas of contiguous habitat of uniform cover type into smaller pieces. Habitat fragmentation would not greatly impede large animals but would hinder smaller species. On a landscape level, habitats are already fragmented in the right-of-way because they are naturally patchy, consisting of fragmented vegetation covers. For example, mixed-grassland/sage-grassland habitat, which is the dominant habitat type in the study area, is characterized by patchy and fragmented mixes of grasses and shrubs. Most woodlands in the right-of-way are interspersed with grassland and sage-grassland. Nevertheless, localized operation impacts from habitat fragmentation would result in vegetation changes, microclimate changes, increased habitat edge, and changes in species composition along the right-of-way.

- **Result in Habitat Degradation**

Operation of the proposed rail line would degrade habitat because of increased noise, dust, and potential spills. Increased noise levels would cause species to avoid or expend more energy nearer the rail line. This would result in fright responses, such as flushing and escaping, as well as increases in communications, such as louder or more extended periods of birdsong or begging vocalizations from young. Noise could cause birds to abandon their nests and result in the subsequent demise of young, especially nearby nesting raptors. Dust would lower the quality of forage. Spills of petrochemicals or other toxic substances during maintenance activities could degrade habitats by rendering them useless as forage or refuge.

- **Result in Habitat Alteration**

Operation of the proposed rail line would permanently alter wildlife habitat. Vegetation maintenance (physical and chemical) to keep the right-of-way clear could encourage the colonization of invasive species, which would reduce available high-quality forage. The rail line would act as a fire source or a potential break (i.e., a gap in vegetation types that slows or stops a fire), changing the natural fire regime of the ecosystem, altering vegetation communities, and fostering the encroachment of woody species into grasslands and shrublands.

Rail operation could also alter habitat to the benefit of some species by installing infrastructure or creating movement corridors that would provide predators with greater

hunting opportunity. This could result in increased mortality rates in the prey of those predators.

- **Displace Wildlife**

  Operation of the proposed rail line would displace wildlife by increasing noise levels and installing vertical infrastructure that would limit the movement of wildlife. Displacement could result in reduced survival and productivity because displacement requires species to expend energy to locate replacement habitat, which may have fewer resources and be of a lower value. Wildlife would be less familiar with new areas and at greater risk of predation, thus limiting survival of offspring or adults. An increase in visible infrastructure would cause displacement because some species would avoid areas within line-of-sight of infrastructure.

- **Create Barriers to Movement**

  Operation of the proposed rail line would prevent smaller wildlife species from crossing the line because they would be obstructed by trains or the railbed itself. This could affect their ability to disperse into other areas to breed. The movement of larger species would be impeded by long trains with up to 150 cars. Although these species would be physically able to cross the rail line at other times, their perception of a barrier could still prevent them from readily crossing the right-of-way. Additionally, fences along the right-of-way would create partial barriers to movement for larger species, especially antelope.

Taxa-Specific Impacts Common to All Build Alternatives

Big Game

Project-related construction and operation would minimally affect large predators that are known to occur in the study area (Section 8.3.3.1, *Mammals*). These predators have large home ranges that are tied to prey abundance and availability. Impacts on a few individuals would be possible; however, because occurrence of large predators in the study area is low, impacts are not anticipated at the population level.

Construction and operation would result in habitat loss, degradation of forage quality, increased mortality rates, and animal displacement for large ungulates. Mule deer, white-tailed deer, and antelope all have high-value winter range in the rights-of-way. Construction activities would remove a portion of their habitat. Construction and operation would also degrade forage quality because of increased dust levels from construction and maintenance vehicles.

Fences along the right-of-way may create a partial barrier to big game by limiting movement across the right-of-way, especially during transitions related to the use of seasonal habitats. Furthermore, direct mortality may result in instances where individuals

unsuccessfully try to pass over, through, or under fences, especially if the fences are not designed for wildlife. The fence design, surrounding topography, and weather conditions (e.g., snow drifts that limit optimal places for passage) could exacerbate the impact. Montana statute (MCA 69-14-702 and -705) requires railroads to construct fence openings every 4 miles (spanning a minimum of 60 feet at each passage) along grazing lands, which would help facilitate movement across the right-of-way.

Increased mortality rates would result from wildlife collisions with construction and maintenance vehicles or trains. Large ungulate populations in this area and in the region are stable, and increased mortality would have minimal impacts on populations. Displacement would also result from construction and operation because large ungulates would avoid increased noise levels and human presence. Large ungulate species are known to habituate to human disturbance including but not limited to surface coal mining activities, rural development, and road construction. Displacement is expected to be a short-term impact (Phillips et al. 1986; Polfus 2011).

Furbearers

Woodland, riparian, grassland, and sage-grassland are the primary habitats used by furbearers. Project-related construction could remove burrows or den sites, cause mortality from wildlife and equipment collisions, and reduce prey availability. These impacts would not significantly affect furbearer populations in the study area because these species are abundant.

Nongame Mammals

Nongame mammals of medium size in the study area include a variety of species that use diverse habitat types. Project-related construction activities could remove burrows, den sites, roost sites, or hibernacula sites in the right-of-way. Most of these species would experience increased mortality because of collisions with trains or equipment. Increased predation would occur because vegetation clearing in the right-of-way would remove adequate cover for prey species and provide corridors and structures (e.g., fences, power poles) that would increase the efficiency of predation. Habitat loss and displacement of prey species would reduce prey availability. Degradation of forage caused by increased dust levels from ground disturbance during project-related construction and maintenance (e.g., vehicles using dirt roads for access) would affect some medium-sized species (e.g., rabbit and skunk). However, these impacts would affect most medium-sized nongame mammal populations in the study area only minimally because these species are abundant and widespread. Most species in this group have a high reproductive output.

Project-related construction and operation would affect a higher number of small nongame mammals because their home ranges are smaller. Impacts would include habitat loss, species displacement, increased mortality, increased predation rates, habitat fragmentation, and

barriers to movement. Species in this group coincide with human development and disturbance, and the impacts would not cause a decline in populations.

Raptors

A variety of raptor species use habitats in the study area for wintering, migration, and breeding (Appendix J, *Wildlife Resources and Special-Status Species*). The degree of impacts would depend on variables pertaining to a certain species' and individual's sensitivity to disturbance, such as the security of nesting substrates, breeding cycles, proximity to the line, and other factors that may modify the frequency or level of impacts, such as *topographic shielding*. General habitat loss would occur with the removal of roosting, perching, and nesting substrates for construction of the proposed rail line. Loss and degradation of foraging habitat would also result; however, foraging habitat for those species that prefer open habitats could increase with clearing the right-of-way. Construction and operation could reduce prey availability by increasing prey mortality or displacing prey. Fences would affect raptors in several ways. Increased mortality rates could result from fence collisions, especially for species that hunt in low light (e.g., owls). Increases in hunting efficiencies could also result with the addition of hunting perches (e.g., fence posts). The displacement of nesting raptors close to the right-of-way could result in decreased reproductive output if pairs are unable to find suitable alternate nesting sites or if nesting pairs abandon eggs or young. Some raptors could acclimate to these impacts, particularly the more tolerant species, such as the red-tailed hawk.

New power lines (even low-voltage, single-phase lines) and communication towers could cause additional impacts on raptors. These impacts include an increase in collision and electrocution hazards for migrating and foraging raptors, especially juveniles (Avian Power Line Interaction Committee 2012, Romin & Muck 2002). Although individuals could be affected, these species are not vulnerable to decline and are stable throughout their range. Therefore, these impacts should not affect species populations.

For special-status raptor species, refer to Section 8.5, *Special-Status Species.*

Upland Game Birds

Upland game birds in the study area use primarily riparian, grassland, and shrubland habitats. Project-related impacts on these species would include loss of nesting, brood rearing, and winter habitats; collisions with trains or project-related traffic; collisions with power lines, communication towers, and fences; displacement due to noise and increased human activity or human-made structures; increased mortality from avian and mammalian predation; and decreased food availability or quality. All upland game bird populations (except greater sage-grouse) are abundant and widespread in the region (Section 8.5, *Special-Status Species*). Therefore, these impacts should not affect species populations because populations in the region are stable and only a small amount of habitat would be removed relative to remaining available habitats in the study area and region.

Migratory Game Birds

Migratory game birds (e.g., waterfowl and other aquatic species) use primarily riparian and associated agricultural fields and wetland habitats. Project-related impacts on migratory game birds would include habitat loss, habitat fragmentation, and displacement of wildlife. Impacts on any given species would be related to the extent of loss of adequate habitat, changes in vegetation cover, and tolerance for disturbance. Construction of the proposed rail line across wetlands and lowlands would alter the suitability of habitats near the line for waterfowl because of changes in water abundance and distribution. Reduced habitat suitability for waterfowl would affect bird survival and reproductive potential during construction and operation of the proposed rail line. Species in this group are widespread and abundant. Therefore, impacts on species populations should be minimal.

Nongame Birds

Nongame birds in the study area, including upland, terrestrial, and nongame water birds, use a wide variety of habitat types. Project-related construction and operation would affect nongame species in different ways and at different times in their life cycle (Appendix J, *Wildlife Resources and Special-Status Species*). Impacts on these species would be related to the extent of loss of adequate habitat; species sensitivity to habitat fragmentation, alteration, or degradation; and tolerance of the species to noise and human disturbance.

Construction and operation of the proposed rail line would cause habitat loss and alterations that would affect all nongame bird species in the area, specifically those that use riparian and woodland habitats. Habitat alterations are generally changes in vegetative communities, such as the conversion of woodland to grassland, that affect the ecosystem. Disturbance to habitats used prior to and during migration could limit the birds' ability to acquire the fat stores needed for migration. This could ultimately reduce the reproductive output of birds when traveling to nesting grounds in the spring or reduce the survival of birds when traveling to wintering grounds in the fall. Construction of the proposed rail line across wetlands and lowlands would alter the suitability of habitats near the rail line because of changes in water abundance and distribution, which would affect shorebirds, wading birds, and other birds that require a water component in their habitat. Loss of nest trees and suitable cavities (i.e., hollowed-out holes in a tree) would result in lost productivity if suitable alternate nesting habitat is not available nearby. All species would experience loss of foraging habitat.

Construction and operation of the proposed rail line would cause habitat fragmentation and associated changes in species composition. The potential loss of species diversity would be higher for avian communities that are particularly sensitive to habitat fragmentation (e.g., species requiring sagebrush habitat). Species abundance and diversity would change in response to vegetation clearing and development of land that would be needed for the right-of-way, especially in larger contiguous habitats and complex habitat structures. Displacement of species and loss of functional habitat would also occur in response to increased noise and human activity.

Construction and operation of the proposed rail line would reduce habitat suitability, affecting bird survival and reproductive potential. Train operation would cause continued disturbance to incubating birds due to train movement and associated noise. This disturbance would decrease reproductive success by flushing (i.e., driving from the nest) incubating birds. Flushed birds could alert predators to the presence of a nest, thereby increasing the rate of predation. Flushing could also contribute to nest failure if the incubating bird is flushed enough times or kept away for longer periods, causing the eggs or nestlings to freeze. Increased noise levels would also affect bird communications by affecting vocalizations between mates, parents, and offspring, or between flock mates. Increased noise levels could result in higher energy expenditure because individuals would need to sing or call louder or more frequently, which could affect fitness, or alert a predator to an individual's presence.

Associated project-related infrastructure would affect species survival and reproductive success. In particular, power lines, communication towers, and fences associated with the proposed rail line would provide perches for predatory birds, facilitating predation on ground-nesting birds. Power lines and communication towers also could present a collision hazard, especially for larger migrating birds. At the same time, power lines, communication towers, or fences could have a beneficial impact on many songbird species, which would use the infrastructure as song perches; this could increase individual reproductive success. Although these impacts could affect individuals, they should not affect nongame bird populations because these species are widespread and stable throughout their ranges.

For special-status bird species, see Section 8.5 *Special-Status Species.*

Reptiles

Reptiles in the study area are generally associated with upland habitats such as grasslands and shrublands. Construction and operation impacts would include habitat loss, fragmentation, and alteration; increased mortality from collisions with trains and predation; and barriers to movement. Reptile species in the study area are widespread and abundant. Construction and operation impacts should not affect species populations.

Amphibians

Amphibians in the study area are generally associated with temporary or seasonal surface waters (e.g., stock tanks and dammed draws that retain temporary spring flows) and the adjacent upland habitats. Construction and operation impacts would include habitat loss, fragmentation, and alteration; increased mortality from predation; and barriers to movement. Construction of the proposed rail line could alter habitats by changing water flow regimes and causing some temporary water features to become dry or other areas to become moist or flooded. In dry years, construction and operation of the proposed rail line would prevent individuals that occupy upland habitats during most of their life cycle from accessing more permanent water sources during the breeding season. This, in turn, would impede the distribution of species as well as gene flow in populations. Construction and operation

impacts would occur at the local level; however, these impacts should not affect species populations in the study area as a whole because amphibian species in the study area are widespread and abundant.

8.3.4.2 Impacts by Build Alternative

The impacts on wildlife that are specific to each build alternative are described below and represented in the following tables and figures.

- Table 8.3-3 shows the amount of habitat in the right-of-way that would be removed.
- Table 8.3-4 shows the density of herds of large ungulates that depend on high-value winter range in the study area.
- Table 8.3-5 shows the number of raptor nests in or near the study area.
- Table 8.3-6 shows the number of sharp-tailed grouse leks in the study area.
- Table 8.3-7 shows bird species richness and abundance in the study area.
- Table 8.3-8 shows reptiles and amphibians species richness in the study area.
- Figure 8.3-1 shows where mule deer winter herds have been observed in the study area.
- Figure 8.3-2 shows where white-tailed deer winter herds have been observed in the study area.
- Figure 8.3-3 shows where antelope winter herds have been observed in the study area.
- Figure 8.3-4 shows locations of raptor nests in the study area.
- Figure 8.3-5 shows locations of sharp-tailed grouse leks in the study area.

Table 8.3-3. Habitat Removal in the Right-of-Way and Associated Road Relocations (acres)

Build Alternative	All Habitats	Mule Deer High-Value Winter Range	White-Tailed Deer High-Value Winter Range	Antelope High-Value Winter Range
Tongue River	3,813.2	1,269.8	3,813.2	224.2
Tongue River East	3,824.0	936.3	3,344.2	243.8
Colstrip	2,078.5	1,138.1	1,355.6	210.9
Colstrip East	2,122.0	804.6	919.3	230.6
Tongue River Road	4,263.6	3,149.9	4,081.1	535.4
Tongue River Road East	4,237.9	2,816.4	3,575.7	555.1
Moon Creek	4,061.1	1,896.2	3,121.5	224.2
Moon Creek East	4,071.9	1,562.7	2,652.5	243.8
Decker	2,841.8	1,476.1	2,616.8	327.6
Decker East	2,710.8	1,482.7	2,463.4	263.2

Table 8.3-4. Winter Density of Large Ungulates Using High-Value Winter Range in the Study Area

Build Alternative	Winter Density[a]		
	Mule Deer	White-Tailed Deer	Antelope
Tongue River	1.17	1.02	0.54
Tongue River East	1.19	1.03	0.53
Colstrip	0.67	0.13	0.66
Colstrip East	0.63	0.12	0.62
Tongue River Road	1.35	1.07	0.73
Tongue River Road East	1.35	1.08	0.72
Moon Creek	1.22	0.83	0.59
Moon Creek East	1.25	0.84	0.57
Decker	0.97	0.58	0.85
Decker East	1.00	0.60	0.87

Notes:
[a] Density = number of animals per survey per square mile of the study area

Table 8.3-5. Number of Raptor Nests in the Study Area

Build Alternative	Right-of-Way[a]	0.25 mile[b]	0.5 mile[c]	2 miles[d]
Tongue River	1	8	20	49
Tongue River East	1	8	20	48
Colstrip	0	3	4	17
Colstrip East	0	3	4	16
Tongue River Road	0	6	14	53
Tongue River Road East	0	6	14	52
Moon Creek	1	5	17	57
Moon Creek East	1	5	17	56
Decker	1	4	10	42
Decker East	1	5	10	41

Notes:
[a] Number of nests that are in the right-of-way or road relocations and would be removed during project-related construction
[b] Number of nests that would be affected, resulting in potential abandonment of nests and or young, and abandonment of territories
[c] Number of nests that would be affected, resulting in decreased reproductive success
[d] Number of nests associated with raptor pairs using foraging habitat that would be affected by construction activities

Table 8.3-6. Number of Sharp-Tailed Grouse Leks and Active Males in the Study Area

Build Alternative	Distance of Leks from Right-of-Way and Road Relocations			Active Leks[a]	Total Peak Male Count[b]
	0.5 mile	2 miles	4 miles		
Tongue River	9	29	57	11	51
Tongue River East	9	33	58	11	51
Colstrip	10	35	71	19	95
Colstrip East	10	39	72	19	95
Tongue River Road	6	29	56	13	52
Tongue River Road East	6	33	57	13	52
Moon Creek	10	23	51	9	38
Moon Creek East	10	27	52	9	38
Decker	8	32	53	6	20
Decker East	9	31	53	6	20

Notes:
[a] Number of active leks within 4 miles of the right-of-way and road relocations in 2013
[b] Peak male counts at the various leks within 4 miles of the right-of-way and road relocations in 2013

Table 8.3-7. Bird Species Richness and Abundance in the Study Area

Build Alternative	Diurnal Point Counts[a]		Nocturnal Point Counts[b]	
	Richness[c]	Abundance[d]	Richness[c]	Abundance[d]
Tongue River	79	11.72	31	3.60
Tongue River East	74	10.26	23	4.07
Colstrip	51	13.18	25	4.39
Colstrip East	40	9.37	17	7.58
Tongue River Road	82	12.01	28	3.06
Tongue River Road East	77	10.28	20	3.21
Moon Creek	77	11.40	29	3.15
Moon Creek East	72	9.74	21	3.25
Decker	61	11.63	27	3.43
Decker East	53	10.00	27	3.88

Notes:
[a] Diurnal point counts were conducted in the 1-mile wildlife study area
[b] Nocturnal point counts were conducted in the 0.5-mile wildlife study area
[c] Richness = total number of species recorded during point-count surveys
[d] Abundance = total number of birds divided by the number of times surveyed. Number of times surveyed varied for each build alternative because of the different build alternative lengths and land access restrictions.

Table 8.3-8. Reptiles and Amphibians Species Richness and Abundance in the Study Area

Build Alternative	Reptile Species Richness[a]	Amphibian Species Richness[a]	Amphibian Abundance[b]
Tongue River	4	4	4.63
Tongue River East	4	4	6.61
Colstrip	2	3	2.89
Colstrip East	1	3	5.33
Tongue River Road	3	4	5.85
Tongue River Road East	3	4	7.90
Moon Creek	5	4	4.64
Moon Creek East	5	4	6.46
Decker	2	4	2.38
Decker East	2	4	2.72

Notes:
Richness and abundance were measured during nocturnal call surveys

[a] Richness = total number of species recorded during 2013 baseline surveys

[b] Abundance = total number of amphibians detected during nocturnal call surveys divided by the number of times surveyed. Number of times surveyed varied for each build alternative because of the different build alternative lengths and land access restrictions.

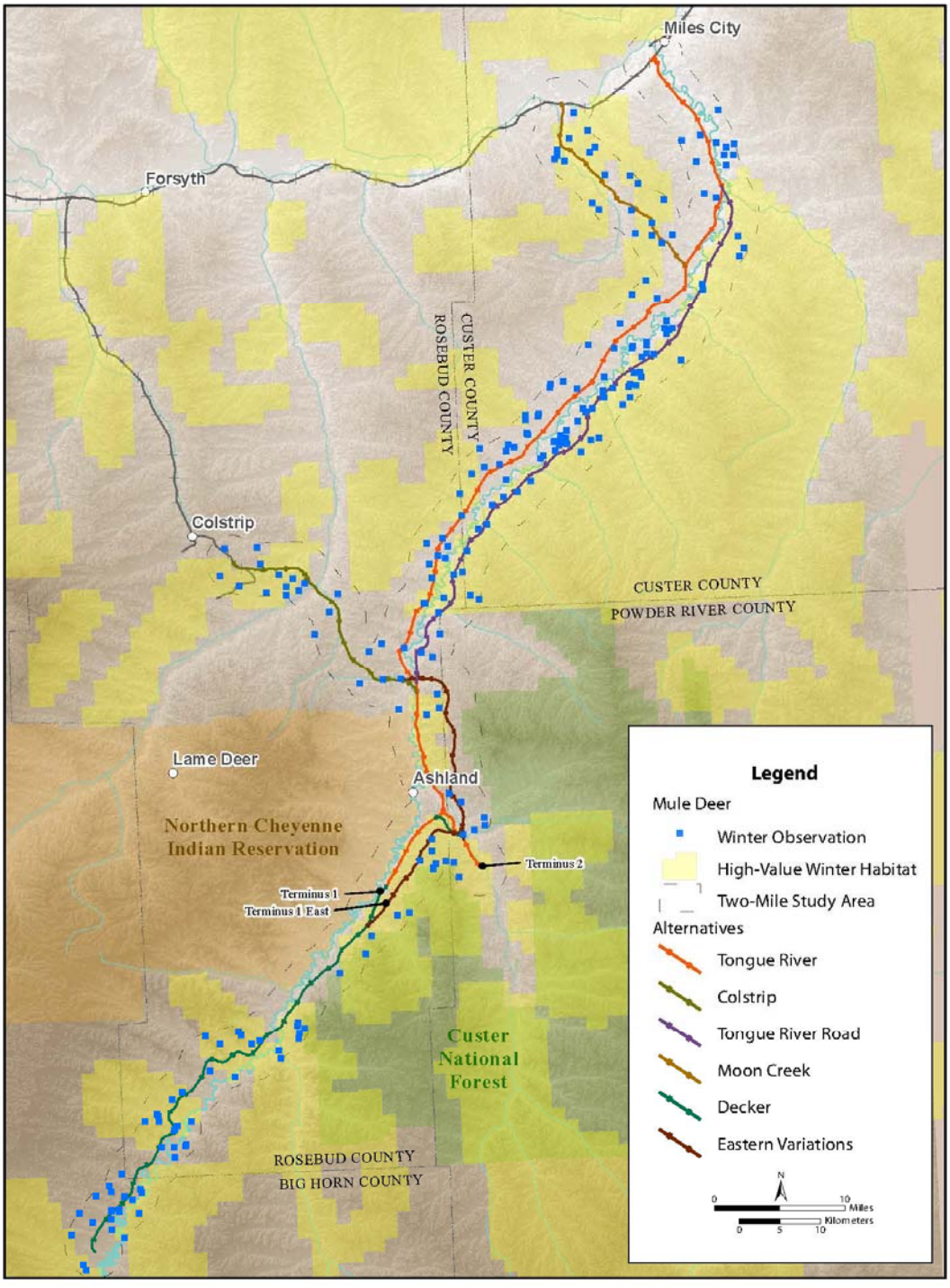

Figure 8.3-1. 2013 Mule Deer Winter Herd Observations

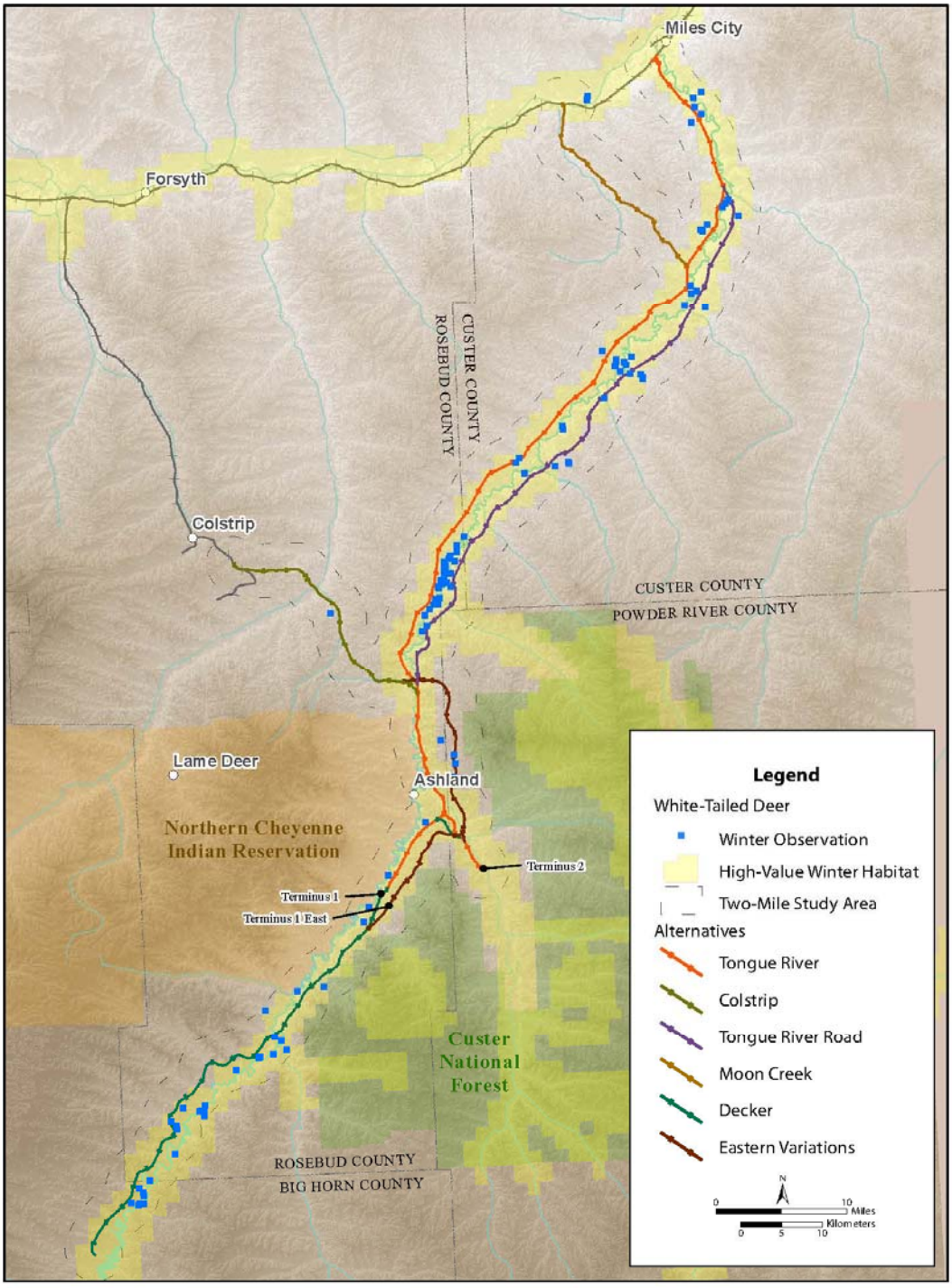

Figure 8.3-2. 2013 White-Tailed Deer Winter Herd Observations

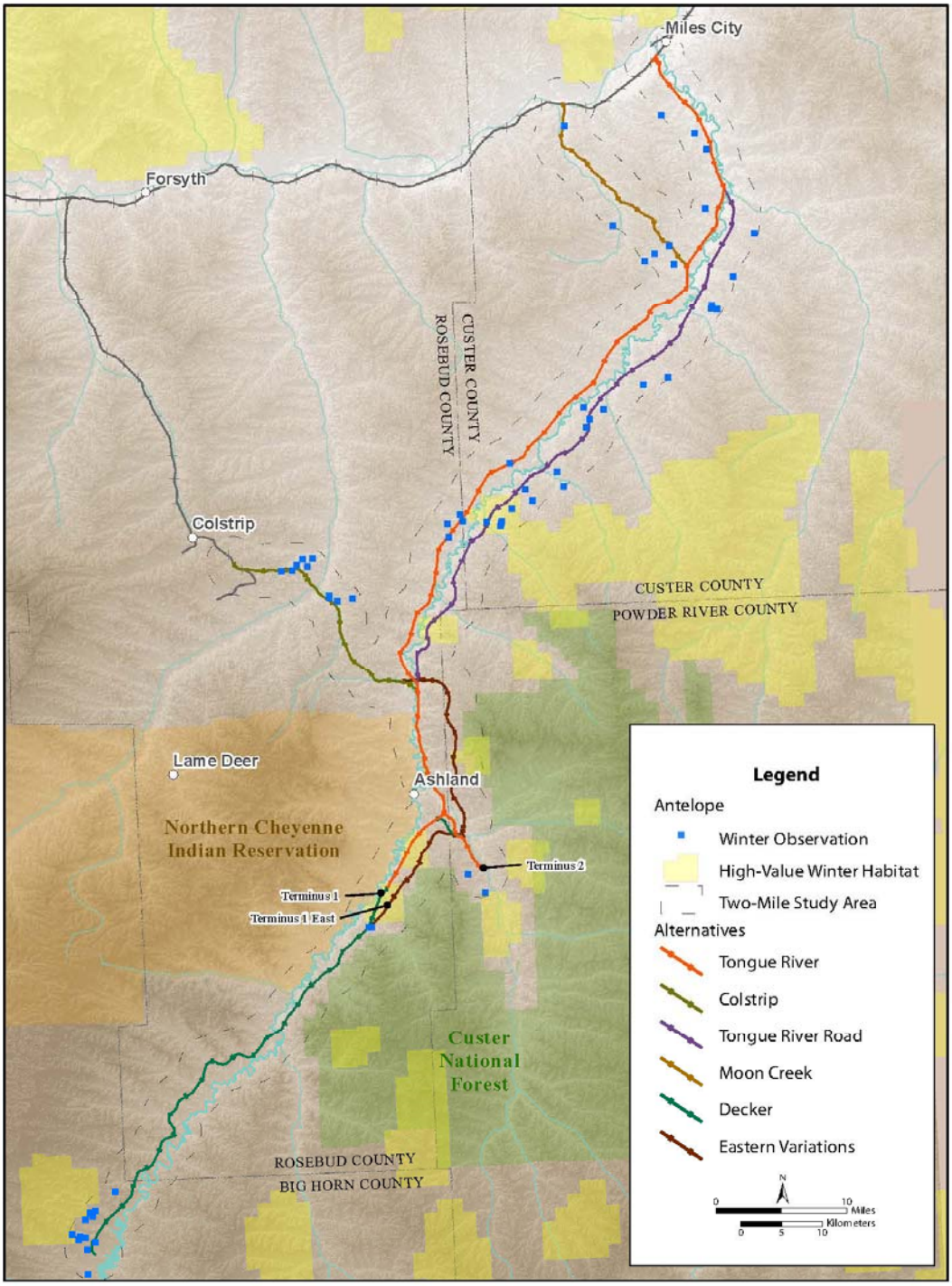

Figure 8.3-3. 2013 Antelope Winter Herd Observations

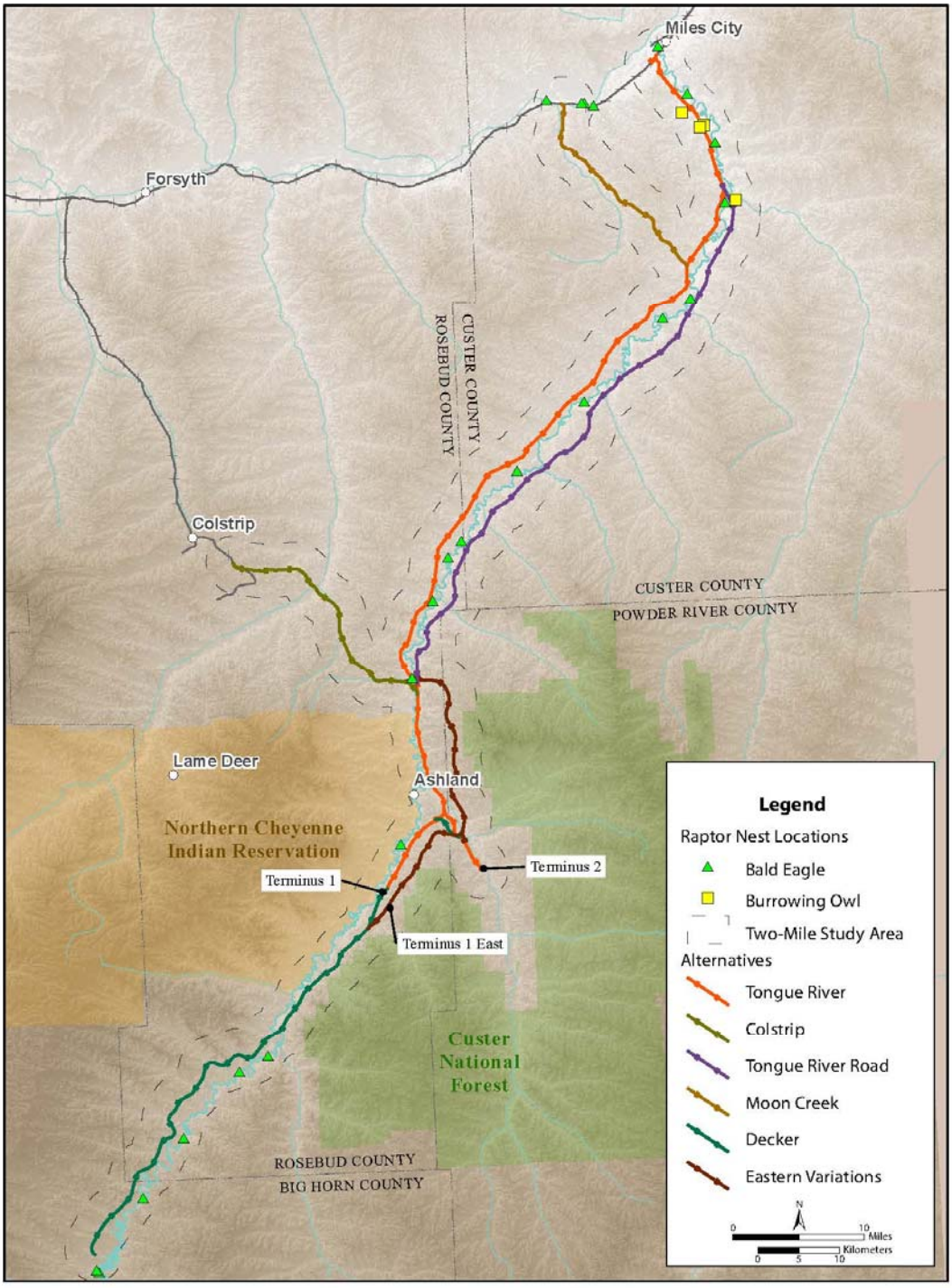

Figure 8.3-4. Raptor Nest Locations

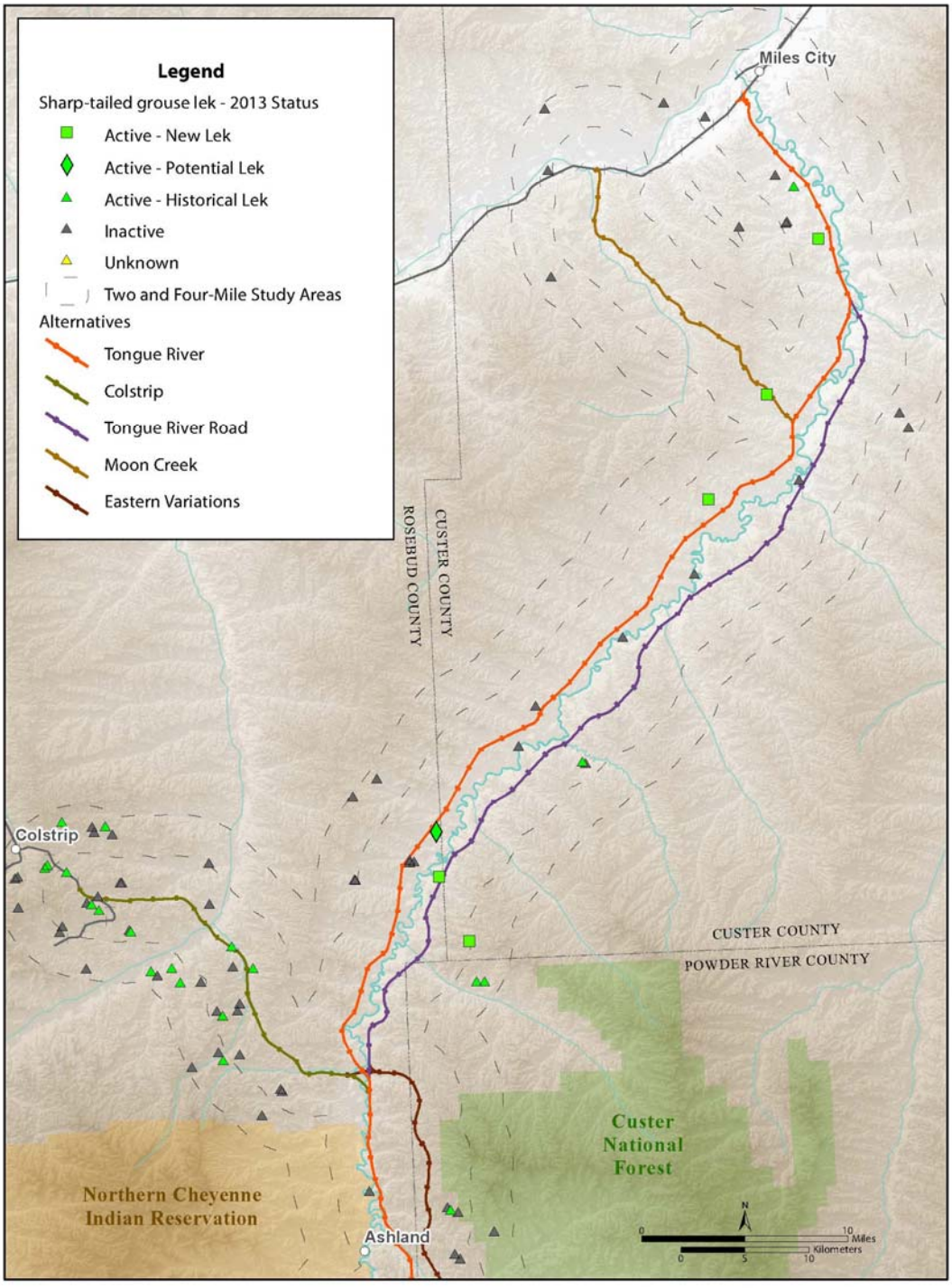

Figure 8.3-5a. Sharp-Tailed Grouse Lek Locations

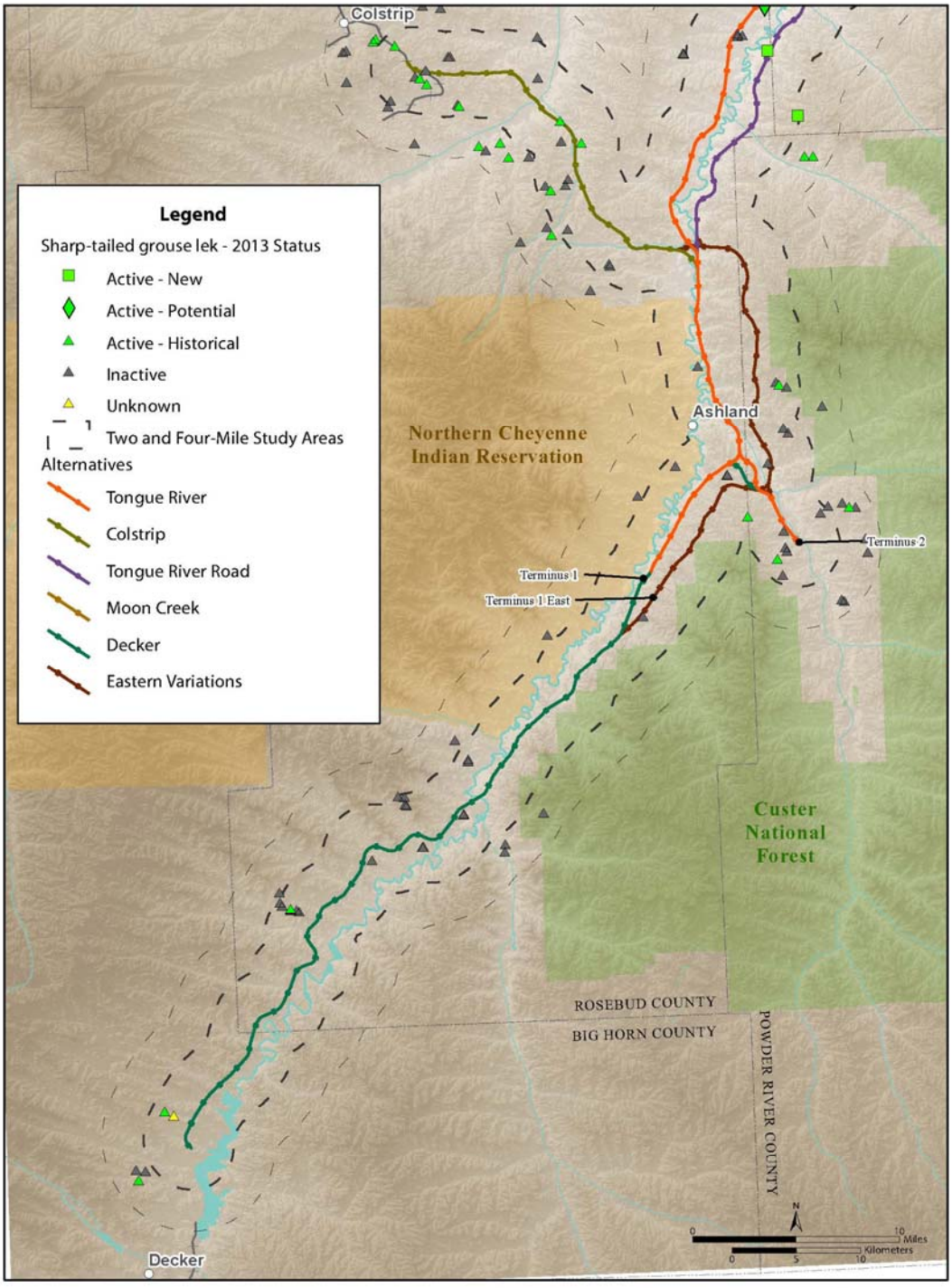

Figure 8.3-5b. Sharp-Tailed Grouse Lek Locations

Tongue River Alternatives

Tongue River Alternative

Construction of the Tongue River Alternative would affect primarily grassland and shrubland habitats. Riparian habitat would be affected at river and tributary crossings, and small amounts of woodland habitats would be affected in the Ashland area. Construction of the Tongue River Alternative would result in the removal of 3,813.2 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. Construction would also result in the removal of 327.8 acres of land that has been incorporated in the Bice/Hirsch Ranch Conservation Easement, which protects riparian and sagebrush grasslands to meet the needs of domestic and wild animals (primarily big game and upland game birds).

The sections below describe the specific impacts of the Tongue River Alternative on each of these species groups, in addition to impacts on raptor nests.

Large Ungulates

Construction of the Tongue River Alternative would result in the removal of 1,269.8 acres of mule deer high-value winter range, 3,813.2 acres of white-tailed deer high-value winter range, and 224.2 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 1.17 mule deer per square mile, 1.02 white-tailed deer per square mile, and 0.54 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation of this build alternative (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3). Note that these numbers would fluctuate with regional population levels as well as animal movement in and out of the study area. This would also be true for all other build alternatives.

Raptor Nests

Construction of the Tongue River Alternative would result in the removal of one unknown raptor nest in the right-of-way. OEA identified eight nests, including one osprey nest and two red-tailed hawk nests within 0.25 mile; 20 nests within 0.5 mile; and 49 nests[4] within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4). These nests would not be removed but could be affected by project-related construction and operation. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations as well as the species of the raptor using the nest. Nests or young closest to project-related construction or operation could be abandoned because of noise or human activity. Impacts at all distances (up to 2 miles) could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

[4] This number is cumulative. The 49 nests within 2 miles of the right-of-way include nests within 0.5 mile of project disturbance, which include the nests within 0.25 mile of project disturbance. This applies to all build alternatives.

Sharp-Tailed Grouse Leks

OEA counted 11 active leks during the surveys it conducted in 2013, with a total peak male count of 51. There are no sharp-tailed grouse leks in the right-of-way, but OEA identified nine sharp-tailed grouse leks within 0.5 mile, 29 leks within 2 miles, and 57 leks[5] within 4 miles of the right-of-way and road relocation areas that could be affected by construction and operation. The degree of impact on sharp-tailed grouse would depend on the distance of the leks from the right-of-way and road relocation areas. Sharp-tailed grouse using leks within 0.5 mile of the right-of-way and road relocation areas would be affected during construction and operation, resulting in displacement and reduced survival because of habitat loss, degradation, and alteration of foraging, nesting, brood rearing, and wintering habitats as well as increased mortality rates. Sharp-tailed grouse using leks within 2 miles of the right-of-way and road relocation areas would be affected in a similar way, although to a lesser degree. Sharp-tailed grouse using leks within 4 miles of the right-of-way and road relocation areas would experience displacement due to habitat alterations, noise, and the presence of human-made structures (Table 8.3-6 and Figure 8.3-5). Displacement could cause higher energy expenditures when the species is seeking replacement nesting, brood rearing, and wintering habitats.

Bird Species Richness and Abundance

Construction and operation of the Tongue River Alternative would affect at least 79 species of birds, most of which are breeders in the study area (Appendix J, *Wildlife Resources and Special-Status Species*). Impacts on bird species within 1 mile of the right-of-way would include displacement, increased mortality, and decreased reproductive success during construction. The degree of impact would depend on a number of variables, including security of nesting substrates, the species' and/or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impact would be higher among species that use grassland and shrubland habitats. These two habitats are available in greater proportion compared with other habitat types; however, more of these habitat types would be removed or disturbed by construction activities. OEA calculated bird species abundance within 1 mile of the right-of-way at 11.72 individuals per survey during the dawn chorus and 3.60 individuals per survey during nocturnal call surveys (Table 8.3-7). In the study area, more birds are active during the day than at night, and this is typical throughout this region.

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would be displaced and would experience increased mortality rates during construction activities:

[5] This number is cumulative. The 57 leks within 4 miles of the right-of-way include the leks within 2 miles of the right-of-way and associated road relocations, which, in turn, include the leks within 0.5 mile of the right-of-way and associated road relocations. This applies to all build alternatives.

gophersnake, eastern racer, painted turtle, prairie rattlesnake, boreal chorus frog, northern leopard frog, American bullfrog, and Woodhouse's toad. Construction and operation would also create a barrier to movement for these species. OEA measured amphibian species abundance for the study area of this build alternative at 4.63 individuals per survey (Table 8.3-8).

Tongue River East Alternative

Construction of the Tongue River East Alternative would result in the removal of 3,824.0 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. Construction and operation of the Tongue River East Alternative would result in the same types and quantities of impacts on each species group as described for the Tongue River Alternative, except as noted below.

Large Ungulates

Construction of the Tongue River East Alternative would result in the removal of 936.3 acres of mule deer high-value winter range, 3,344.2 acres of white-tailed deer high-value winter range, and 243.8 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 1.19 mule deer per square mile, 1.03 white-tailed deer per square mile, and 0.53 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

Construction of the Tongue River East Alternative would result in the removal of one unknown raptor nest in the right-of-way. OEA identified eight nests, including one osprey nest and two red-tailed hawk nests within 0.25 mile; 20 nests within 0.5 mile; and 48 nests within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4).

Sharp-Tailed Grouse Leks

There are no sharp-tailed grouse leks in the right-of-way, but OEA identified nine sharp-tailed grouse leks within 0.5 mile, 33 leks within 2 miles, and 58 leks within 4 miles of the right-of-way and road relocations that could be affected by construction and operation.

Bird Species Richness and Abundance

Construction and operation of the Tongue River East Alternative would affect at least 74 bird species. OEA calculated bird species abundance within 1 mile of the right-of-way at 10.26 individuals per survey during the dawn chorus and 4.07 individuals per survey during nocturnal call surveys (Table 8.3-7).

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would be displaced and would experience increased mortality rates during construction activities: gophersnake, eastern racer, painted turtle, prairie rattlesnake, boreal chorus frog, northern leopard frog, American bullfrog, and Woodhouse's toad. OEA measured amphibian species abundance for the study area of this build alternative at 6.61 individuals per survey (Table 8.3-7).

Colstrip Alternatives

Colstrip Alternative

Construction of the Colstrip Alternative would affect primarily mixed-grassland and shrubland habitats as well as woodland habitats. A small amount of riparian habitat would be affected at river and tributary crossings. Construction of the Colstrip Alternative would result in the removal of 2,078.5 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. The sections below describe the specific impacts of the Colstrip Alternative on each of these species groups, in addition to its impacts on raptors.

Large Ungulates

Habitat removed from the right-of-way would include 1,138.1 acres of mule deer high-value winter range, 1,355.6 acres of white-tailed deer high-value winter range, and 210.9 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 0.67 mule deer per square mile, 0.13 white-tailed deer per square mile, and 0.66 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

No raptor nests would be removed from the Colstrip Alternative right-of-way. OEA identified three nests, including one red-tailed hawk nest, one long-eared owl nest, and one unknown raptor nest within 0.25 mile; four nests within 0.5 mile; and 17 nests within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4). These nests would not be removed but could be affected by construction and operation. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations as well as the species of the raptor using the nest. Nests or young closest to construction and operation could be abandoned because of noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Sharp-Tailed Grouse Leks

OEA counted 19 active leks in 2013, with a total peak male count of 95. There are no sharp-tailed grouse leks in the right-of-way, but OEA identified 10 leks within 0.5 mile, 35 leks within 2 miles, and 71 leks within 4 miles of the right-of-way and road relocations that could be affected by construction and operation. The degree of impact on sharp-tailed grouse would depend on the distance of the leks from the right-of-way and road relocations. Sharp-tailed grouse using leks within 0.5 mile of the right-of-way and road relocations would be affected during construction and operation, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, nesting, brood rearing, and wintering habitats as well as increased mortality rates. Sharp-tailed grouse using leks within 2 miles of the right-of-way and road relocations would be affected in a similar way, although to a lesser degree. Sharp-tailed grouse using leks within 4 miles of the right-of-way and road relocations would experience displacement due to habitat alterations, noise, and the presence of human-made structures (Table 8.3-6 and Figure 8.3-5). Displacement could cause higher energy expenditures when the species is seeking replacement nesting, brood rearing, and wintering habitats.

Bird Species Richness and Abundance

Removal of habitat would affect at least 51 species of birds, most of which are breeders in the study area (Appendix J, *Wildlife Resources and Special-Status Species*). Impacts on the same number of bird species within 1 mile of the right-of-way and road relocations would include displacement, increased mortality, and decreased reproductive success during construction and operation. The degree of impact would depend on a number of variables, including the security of nesting substrates, species' and/or individual's sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impacts would be higher in species that use mixed-grassland and shrubland habitats as well as woodland habitat. These three habitats are available in greater proportion compared with other habitat types; however, more of these habitat types would be removed or disturbed by construction and operation. OEA calculated bird species abundance within 1 mile of the right-of-way at 13.18 individuals per survey during the dawn chorus and 4.39 individuals per survey during nocturnal call surveys (Table 8.3-7). In the study area, more birds are active during the day than at night; this is typical throughout this region.

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would be displaced and would experience increased mortality during construction activities: gophersnake, eastern racer, boreal chorus frog, northern leopard frog, and Woodhouse's toad. Construction and operation would also create a barrier to movement for these species. OEA measured amphibian species abundance for the study area of this build alternative at 2.89 individuals per survey (Table 8.3-8).

Colstrip East Alternative

Construction of the Colstrip East Alternative would result in the removal of 2,122.0 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. Construction and operation of the Colstrip East Alternative would result in the same types and quantities of impacts on each species group as described for the Colstrip Alternative, except as noted below.

Large Ungulates

Construction of the Colstrip East Alternative would result in the removal of 804.6 acres of mule deer high-value winter range, 919.3 acres of white-tailed deer high-value winter range, and 230.6 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 0.63 mule deer per square mile, 0.12 white-tailed deer per square mile, and 0.62 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

No raptor nests would be removed from the Colstrip East Alternative right-of-way during construction. OEA identified three nests, including one red-tailed hawk nest, one long-eared owl nest, and one unknown raptor nest within 0.25 mile; four nests within 0.5 mile; and 16 nests within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4).

Sharp-Tailed Grouse Leks

There are no sharp-tailed grouse leks in the right-of-way, but OEA identified 10 sharp-tailed grouse leks within 0.5 mile, 39 leks within 2 miles, and 72 leks within 4 miles of the right-of-way and road relocations that could be affected during construction and operation.

Bird Species Richness and Abundance

Construction and operation of the Colstrip East Alternative would affect at least 40 bird species. OEA calculated bird species abundance within 1 mile of the right-of-way at 9.37 individuals per survey during the dawn chorus and 7.58 individuals per survey during nocturnal call surveys (Table 8.3-7).

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would be displaced and would experience increased mortality rates during construction activities: eastern racer, boreal chorus frog, northern leopard frog, and Woodhouse's toad. OEA measured amphibian species abundance for the study area of this build alternative at 5.33 individuals per survey (Table 8.3-8).

Tongue River Road Alternatives

Tongue River Road Alternative

Construction of the Tongue River Road Alternative would affect primarily grassland and shrubland habitats. Riparian habitat would be affected at river and tributary crossings; small amounts of woodland habitat would also be affected in the Ashland area. Construction of the Tongue River Road Alternative would result in the removal of 4,263.2 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. The sections below describe the specific impacts of the Tongue River Road Alternative on each of these species groups, in addition to its impacts on raptors.

Large Ungulates

Habitat removed from the right-of-way and road relocation areas under the Tongue River Road alternative would include 3,149.9 acres of mule deer high-value winter range, 4,081.1 acres of white-tailed deer high-value winter range, and 535.4 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 1.35 mule deer per square mile, 1.07 white-tailed deer per square mile, and 0.73 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation activities (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

No raptor nests would be removed from the Tongue River Road Alternative right-of-way or road relocation areas during construction. OEA identified six nests, including one red-tailed hawk nest and one osprey nest within 0.25 mile; 14 nests within 0.5 mile; and 53 nests within 2 miles of the right-of way and road relocation areas (Table 8.3-5 and Figure 8.3-4). These nests would not be removed but could be affected by construction and operation. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations as well as the species of the raptor using the nest. Nests or young closest to construction and operation could be abandoned because of noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Sharp-Tailed Grouse Leks

OEA counted 13 active leks in 2013, with a total peak male count of 52, in the study area. No sharp-tailed grouse leks exist in the right-of-way or road relocation areas, but OEA identified six leks within 0.5 mile, 29 leks within 2 miles, and 56 leks within 4 miles of the right-of-way and road relocations that could be affected by construction and operation. The degree of impact on sharp-tailed grouse would depend on the distance of the leks from the right-of-way and road relocations. Sharp-tailed grouse using leks within 0.5 mile of the

right-of-way and road relocations would be affected during construction and operation, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, nesting, brood rearing, and wintering habitats as well as increased mortality rates. Sharp-tailed grouse using leks within 2 miles of the right-of-way and road relocations would be affected in a similar way, although to a lesser degree. Sharp-tailed grouse using leks within 4 miles of the right-of-way and road relocations would experience displacement due to habitat alterations, noise, and the presence of human-made structures (Table 8.3-6 and Figure 8.3-5). Displacement could cause higher energy expenditures when the species is seeking replacement nesting, brood rearing, and wintering habitats.

Bird Species Richness and Abundance

Removal of habitat to construct and operate the Tongue River Road Alternative would affect at least 82 species of birds, most of which are breeders in the study area (Appendix J, *Wildlife Resources and Special-Status Species*). Impacts on 82 bird species within 1 mile of the right-of-way could include displacement, increased mortality, and decreased reproductive success during construction and operation. The degree of impact would depend on a number of variables, including the security of nesting substrates, the species' and/or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impact would be higher in species that use grassland and shrubland habitats. These two habitats are available in greater proportion compared with other habitat types; however, more of these habitat types would be removed or disturbed by construction and operation. OEA calculated bird species abundance within 1 mile of the right-of-way at 12.01 individuals per survey during the dawn chorus and 3.06 individuals per survey during nocturnal call surveys (Table 8.3-7). In the Tongue River Road Alternative's study area, more birds are active during the day than at night, and this is typical throughout this region.

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would experience increased mortality rates during construction activities: gophersnake, eastern racer, painted turtle, boreal chorus frog, northern leopard frog, and Woodhouse's toad. Construction and operation would also create a barrier to movement for these species. OEA measured amphibian species abundance for the study area of this build alternative at 5.85 individuals per survey (Table 8.3-8).

Tongue River Road East Alternative

Construction of the Tongue River Road East Alternative would result in the removal of 4,237.9 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. Construction and operation of the Tongue

River Road East Alternative would result in the same types and quantities of impacts on each species group as described for the Tongue River Road Alternative, except as noted below.

Large Ungulates

Construction of the Tongue River Road East Alternative would result in the removal of 2,816.4 acres of mule deer high-value winter range, 3,575.7 acres of white-tailed deer high-value winter range, and 555.1 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 1.35 mule deer per square mile, 1.08 white-tailed deer per square mile, and 0.72 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation activities (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

No raptor nests would be removed from the Tongue River Road East Alternative right-of-way because of construction. OEA identified six nests, including one osprey nest and one red-tailed hawk nest within 0.25 mile; 14 nests within 0.5 mile; and 52 nests within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4).

Sharp-Tailed Grouse Leks

There are no sharp-tailed grouse leks in the right-of-way, but OEA identified six leks within 0.5 mile, 33 leks within 2 miles, and 57 leks within 4 miles of the right-of-way and road relocation areas that could be affected by construction and operation (Table 8.3-6 and Figure 8.3-5).

Bird Species Richness and Abundance

Construction and operation of the Tongue River Road East Alternative would affect at least 77 bird species. OEA calculated bird species abundance within 1 mile of the right-of-way at 10.28 individuals per survey during the dawn chorus and 3.21 individuals per survey during nocturnal call surveys (Table 8.3-7).

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would be displaced and would experience increased mortality rates during construction activities: gophersnake, eastern racer, painted turtle, boreal chorus frog, northern leopard frog, and Woodhouse's toad. OEA measured amphibian species abundance for the study area of this build alternative at 7.9 individuals per survey (Table 8.3-8).

Moon Creek Alternatives

Moon Creek Alternative

Construction of the Moon Creek Alternative would affect primarily grassland and shrubland habitat. Riparian habitat would be affected along Moon Creek and at river and tributary crossings. Small amounts of woodland habitats would be affected in the Moon Creek and Ashland areas. Construction of the Moon Creek Alternative would result in the removal of 4,061.1 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. Construction would also result in the removal of 327.8 acres of land that has been incorporated in the Bice/Hirsch Ranch Conservation Easement, which protects riparian and sagebrush grasslands to meet the needs of domestic and wild animals (primarily big game and upland game birds).

The sections below describe the specific impacts of the Moon Creek Alternative on each of these species groups, in addition to its impacts on raptors.

Large Ungulates

Habitat removed from the right-of-way and road relocations would include 1,896.2 acres of mule deer high-value winter range, 3,121.5 acres of white-tailed deer high-value winter range, and 224.2 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 1.22 mule deer per square mile, 0.83 white-tailed deer per square mile, and 0.59 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation activities (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

Construction of the Moon Creek Alternative would result in the removal of one unknown raptor nest in the right-of-way. OEA identified five unknown raptor nests within 0.25 mile, 17 nests within 0.5 mile, and 57 nests within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4). These nests would not be removed but could be affected by construction and operation. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations as well as the species of the raptor using the nest. Nests or young closest to construction and operation could be abandoned because of noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Sharp-Tailed Grouse Leks

OEA counted nine active leks in 2013, with a total peak male count of 38. There are no sharp-tailed grouse leks in the right-of-way, but OEA identified 10 leks within 0.5 mile,

23 leks within 2 miles, and 51 leks within 4 miles of the right-of-way and road relocation areas that could be affected by construction and operation. The degree of impact on sharp-tailed grouse would depend on the distance of the leks from the right-of-way and road relocations. Sharp-tailed grouse using leks within 0.5 mile of the right-of-way and road relocations would be affected during construction and operation, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, nesting, brood rearing, and wintering habitats as well as increased mortality rates. Sharp-tailed grouse using leks within 2 miles of the right-of-way and road relocations would be affected in a similar way, although to a lesser degree. Sharp-tailed grouse using leks within 4 miles of the right-of-way and road relocations would experience displacement due to habitat alterations, noise, and the presence of human-made structures (Table 8.3-6 and Figure 8.3-5). Displacement could cause higher energy expenditures when the species is seeking replacement nesting, brood rearing, and wintering habitats.

Bird Species Richness and Abundance

Removal of habitat to allow construction and operation would affect at least at least 77 species of birds, most of which are breeders in the study area (Appendix J, *Wildlife Resources and Special-Status Species*). Impacts on 77 bird species within 1 mile of the right-of-way could include displacement, increased mortality, and decreased reproductive success during construction and operation. The degree of impact would depend on a number of variables, including the security of nesting substrates, the species' and/or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impact would be higher in species that use grassland and shrubland habitats. These two habitats are available in greater proportion compared with other habitat types; however, more of these habitat types would be removed or disturbed by construction and operation. OEA calculated bird species abundance within 1 mile of the right-of-way at 11.40 individuals per survey during the dawn chorus and 3.15 individuals per survey during nocturnal call surveys (Table 8.3-7). In the study area, more birds are active during the day than at night, and this is typical throughout this region.

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would be displaced and would experience increased mortality rates during construction activities: gophersnake, eastern racer, painted turtle, plains gartersnake, prairie rattlesnake, American bullfrog, boreal chorus frog, northern leopard frog, and Woodhouse's toad. Construction and operation would also create a barrier to movement for these species. OEA measured amphibian species abundance for the study area of this build alternative at 4.64 individuals per survey (Table 8.3-8).

Moon Creek East Alternative

Construction of the Moon Creek East Alternative would result in the removal of 4,071.9 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. Construction and operation of the Moon Creek East Alternative would result in the same types and quantities of impacts on each species group as described for the Moon Creek Alternative, except as noted below.

Large Ungulates

Construction of the Moon Creek East Alternative would result in the removal of 1,562.7 acres of mule deer high-value winter range, 2,652.5 acres of white-tailed deer high-value winter range, and 243.8 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 1.25 mule deer per square mile, 0.84 white-tailed deer per square mile, and 0.57 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

Construction of the Moon Creek East Alternative would result in the removal of one unknown raptor nest in the right-of-way. OEA identified five nests within 0.25 mile, 17 nests within 0.5 mile, and 56 nests within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4).

Sharp-Tailed Grouse Leks

There are no sharp-tailed grouse leks in the right-of-way, but OEA identified 10 leks within 0.5 mile, 27 leks within 2 miles, and 52 leks within 4 miles of the right-of-way and road relocations (Table 8.3-6 and Figure 8.3-5).

Bird Species Richness and Abundance

Construction and operation of the Moon Creek East Alternative would affect at least 72 bird species. OEA calculated bird species abundance within 1 mile of the right-of-way at 9.74 individuals per survey during the dawn chorus and 3.25 individuals per survey during nocturnal call surveys (Table 8.3-7).

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, six reptile species and four amphibian species would be displaced and would experience increased mortality rates. These species are gophersnake, eastern racer, painted turtle, plains gartersnake, prairie rattlesnake, American bullfrog, boreal chorus frog, northern leopard frog, and Woodhouse's toad. OEA measured amphibian

species abundance for the study area of this build alternative at 6.46 individuals per survey (Table 8.3-8).

Decker Alternatives

Decker Alternative

Construction of the Decker Alternative would affect primarily woodland and grassland habitats. Small amounts of shrubland and riparian habitats would be affected at river and tributary crossings. Construction of the Decker Alternative would result in the removal of 2,841.8 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. The sections below describe the specific impacts of the Decker Alternative on each of these species groups, in addition to its impacts on raptors.

Large Ungulates

Habitat removed from the right-of-way would include 1,476.1 acres of mule deer high-value winter range, 2,616.8 acres of white-tailed deer high-value winter range, and 327.6 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 0.97 mule deer per square mile, 0.58 white-tailed deer per square mile, and 0.85 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

Construction of the Decker Alternative would result in the removal of one unknown raptor nest in the right-of-way. OEA identified four nests, including a prairie falcon nest, within 0.25 mile; 10 nests within 0.5 mile; and 42 nests within 2 miles of the right-of way and road relocations (Table 8.3-5 and Figure 8.3-4). These nests would not be removed but could be affected by construction and operation. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations as well as the species of the raptor using the nest. Nests or young closest to construction or operation activities could be abandoned because of noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Sharp-Tailed Grouse Leks

OEA counted six active leks in 2013, with a total peak male count of 20, in the study area for the Decker Alternatives. There are no sharp-tailed grouse leks in the right-of-way, but OEA identified eight leks within 0.5 mile, 32 leks within 2 miles, and 53 leks within 4 miles of the right-of-way that could be affected by construction and operation. The degree of impact on sharp-tailed grouse would depend on the distance of the leks from the right-of-way and road relocations. Sharp-tailed grouse using leks within 0.5 mile of the right-of-way and road

relocations would be affected during construction and operation, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, nesting, brood rearing, and wintering habitats as well as increased mortality rates. Sharp-tailed grouse using leks within 2 miles of the right-of-way and road relocations would be affected in a similar way, although to a lesser degree. Sharp-tailed grouse using leks within 4 miles of the right-of-way and road relocations would experience displacement due to habitat alterations, noise, and the presence of human-made structures (Table 8.3-6 and Figure 8.3-5). Displacement could cause higher energy expenditures when the species is seeking replacement nesting, brood rearing, and wintering habitats.

Bird Species Richness and Abundance

Removal of habitat would affect at least 61 species of birds, most of which are breeders in the study area (Appendix J, *Wildlife Resources and Special-Status Species*). Impacts on 61 bird species within 1 mile of the right-of-way could include displacement, increased mortality, and decreased reproductive success during construction and operation. The degree of impact would depend on a number of variables, including the security of nesting substrates, the species' and/or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impact would be higher in species that use woodland and grassland habitats. These two habitats are available in greater proportion compared with other habitat types; however, more of these habitat types would be removed or disturbed by construction. OEA calculated bird species abundance within 1 mile of the right-of-way at 11.63 individuals per survey during the dawn chorus and 3.43 individuals per survey during nocturnal call surveys (Table 8.3-7). In the study area, more birds are active during the day than at night, and this is typical throughout this region.

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results, the following reptile and amphibian species would be displaced and would experience increased mortality rates during construction: gophersnake, painted turtle, American bullfrog, boreal chorus frog, northern leopard frog, and Woodhouse's toad. Construction and operation would also create a barrier to movement for these species. OEA measured amphibian species abundance for the study area of this build alternative at 2.38 individuals per survey (Table 8.3-8).

Decker East Alternative

Construction of the Decker East Alternative would result in the removal of 2,710.8 acres of wildlife habitat in the right-of-way and road relocation areas, all of which is considered habitat for large ungulates, sharp-tailed grouse, and other birds and most of which is suitable habitat for reptiles and amphibians. Construction and operation of the Decker East Alternative would result in the same types and quantities of impacts on each species group as described for the Decker Alternative, except as noted below.

Large Ungulates

Construction of the Decker East Alternative would result in the removal 1,482.7 acres of mule deer high-value winter range, 2,463.4 acres of white-tailed deer high-value winter range, and 263.2 acres of antelope high-value winter range (Table 8.3-3). The current densities of these species in the study area of this build alternative are estimated to be 1.00 mule deer per square mile, 0.60 white-tailed deer per square mile, and 0.87 antelope per square mile. This is the estimated number of individuals that could be affected per square mile of habitat removed and during operation (Table 8.3-4 and Figures 8.3-1, 8.3-2, and 8.3-3).

Raptor Nests

Construction of the Decker East Alternative would result in the removal of one unknown raptor nest in the right-of-way. OEA identified five nests, including a prairie falcon nest, within 0.25 mile; 10 nests within 0.5 mile; and 41 nests within 2 miles of the right-of way and road relocations (Table 8.3-4 and Figure 8.3-4).

Sharp-Tailed Grouse Leks

There are no sharp-tailed grouse leks in the Decker East right-of-way, but OEA identified nine leks within 0.5 mile, 31 leks within 2 miles, and 53 leks within 4 miles of the right-of-way and road relocations (Table 8.3-6 and Figure 8.3-5).

Bird Species Richness and Abundance

Construction and operation of the Decker East Alternative would affect at least 53 species of birds. OEA calculated bird species abundance within 1 mile of the right-of-way at 10 individuals per survey during the dawn chorus and 3.88 individuals per survey during nocturnal call surveys (Table 8.3-7).

Reptile and Amphibian Species Richness and Abundance

Based on 2013 baseline survey results involving Decker East, the following reptile and amphibian species would be displaced and would experience increased mortality rates during construction activities: are gophersnake, painted turtle, American bullfrog, boreal chorus frog, northern leopard frog, and Woodhouse's toad. OEA measured amphibian species abundance for the study area of this build alternative at 2.72 individuals per survey (Table 8.3-8).

8.3.4.3 No-Action Alternative

Under the No-Action Alternative, TRRC would not construct or operate the proposed Tongue River Railroad, and there would be no impacts on wildlife resources from construction or operation of the proposed rail line.

8.3.4.4 Mitigation and Unavoidable Environmental Consequences

To avoid or minimize the environmental impacts on wildlife from the proposed rail line, OEA is recommending that the Board impose eight mitigation measures, including four measures volunteered by TRRC (Chapter 19, Section 19.2.5, *Biological Resources*). These measures would require TRRC to develop a raptor nest monitoring program, reduce power line and communication tower risks to birds with appropriate design and siting, reduce risks to breeding birds by timing vegetation clearing activities, design the right-of-way fence to minimize disruptions to the established wildlife movement pattern, avoid bald eagle disturbance during the nesting season, reduce collision and electrocution risks to birds, design the rail line to follow existing transportation corridors and thus minimize disruption of wildlife movement patterns, and develop and implement a fire prevention plan.

Even with implementation of OEA's recommended mitigation measures and TRRC's voluntary measures, construction and operation of the proposed rail line would cause unavoidable impacts on wildlife. The impacts could include lost, altered, and degraded habitat; wildlife mortality; habitat fragmentation; an increase in barriers to movement; the displacement of wildlife; and a change in species composition. However, populations of common wildlife species addressed in this section are secure and not vulnerable to decline. OEA concludes that these adverse impacts would be minor.

8.4 Fish

This section describes the impacts on fish that would result from construction and operation of each of the build alternatives. The subsections that follow describe the fish in the study area, the methods used to determine possible fish presence and analyze potential impacts, the affected environment, and the impacts of the build alternatives on fish. The regulations and guidance related to fish are summarized in Section 8.6, *Applicable Regulations*. Appendix K, *Fish Resources*, provides further data on methods and fish metrics. Five special-status fish species are found in the study area: the pallid sturgeon, paddlefish, sturgeon chub, sauger, and blue sucker. These are addressed in Section 8.5, *Special-Status Species*. The contribution of the proposed rail line to cumulative impacts on fish is discussed in Chapter 18, *Cumulative Impacts*.

In summary, the Tongue River is the largest fish-bearing water body in the study area and supports the greatest diversity of species. The Tongue River and its tributaries support 49 documented species of fish (31 native species and 18 nonnative species). Of the 31 native fish species, five are special-status species and are found in the Tongue River. Each of the build alternatives would require bridge crossings and tracks that would affect the Tongue River and other fish habitats, and could affect fish passage during construction. The Moon Creek Alternatives would require bridge crossings and tracks that would affect Moon Creek. The Colstrip Alternatives would require bridge crossing over Rosebud Creek. Several smaller fish-bearing streams in the study area would be affected at locations where build alternatives cross fish-bearing streams with bridges or culverts.

The Tongue River Alternative would affect the most fish-bearing aquatic habitat along the Tongue River. This build alternative would have 10.7 miles of track within 985 feet of the Tongue River channel and require two bridge crossings of perennial fish-bearing streams and culvert crossings of 19 intermittent fish-bearing streams. The Tongue River Road Alternative would have 10.3 miles of track within 985 feet of the Tongue River and require five bridge crossings. Although the Moon Creek Alternative would require fewer bridge crossings (four), it would have more miles of track within 985 feet of fish-bearing streams (17.6 miles near the Tongue River and Moon Creek). The Tongue River East Alternative, Colstrip East Alternative, Tongue River Road East Alternative, and Moon Creek East Alternative would have fewer miles of track within 985 feet of the Tongue River than the other build alternatives but each would relocate a road, resulting in an additional bridge crossing over Otter Creek. The Decker East Alternative would affect the least amount of fish-bearing aquatic habitat, requiring 0.9 mile of track within 985 feet of the Tongue River channel. It would require one bridge crossing of the Tongue River.

Although the fish species addressed in this section are secure and not vulnerable to decline, construction and operation of the proposed rail line would cause some impacts. OEA concludes that these adverse impacts would be minor.

8.4.1 Study Area

OEA defined the study area for fish as all fish-bearing rivers or streams within 2 miles of the centerline of the right-of-way (hereafter referred to as fish-bearing streams). The 2-mile study area provides for an adequate characterization of the fish-bearing streams and a thorough evaluation of the impacts of any build alternative on fish and fish habitat (Figures 8.4-1a and 8.4-1b). The study area is located in the Northern Great Plains ecoregion (Omernik 1995, U.S. Environmental Protection Agency 2012), an area with a diverse native and nonnative fish community, which is composed of up to 63 species (Stagliano 2005).

8.4.2 Analysis Methods

OEA used the methods described below to identify and survey the streams in the study area and evaluate the impacts of construction and operation of the build alternatives on fish in the study area.

8.4.2.1 Literature Search

OEA reviewed existing data on fish species and fish habitat in the study area. Information was gathered from Montana Fish, Wildlife & Parks (Montana FWP); the Montana Department of Natural Resources and Conservation; Montana Natural Heritage Program; U.S. Fish and Wildlife Service (USFWS); scientific literature, and regional monitoring program documentation.

8.4.2.2 River and Stream Habitat Surveys

Habitat survey locations were selected from fish-bearing streams in the 2-mile study area based on their proximity to the right-of-way and potential for exposure to impacts from the proposed rail line. Montana FWP identified rivers and streams within 985 feet (300 meters) of any build alternative as most susceptible to construction and operational impacts (Schmitz pers. comm.). Although the amount of fish-bearing stream habitat in the 2-mile study area is extensive, only a small portion falls within the 985-foot range. However, the 2-mile study area is important because it includes sites outside of the 985-foot limit that are representative of sites that OEA could not access. Therefore, OEA selected survey sites to develop a representative sample of habitat conditions in the study area. All selected survey sites met at least one of the following criteria.

- The site was located at or near the point where a build alternative would cross a fish-bearing stream.
- The site was located within 985 feet of the right-of-way where a fish-bearing stream would be parallel or adjacent to a build alternative.
- The site was representative of those stream habitats within 985 feet of the right-of-way or a stream crossing but could not be surveyed because of access constraints.

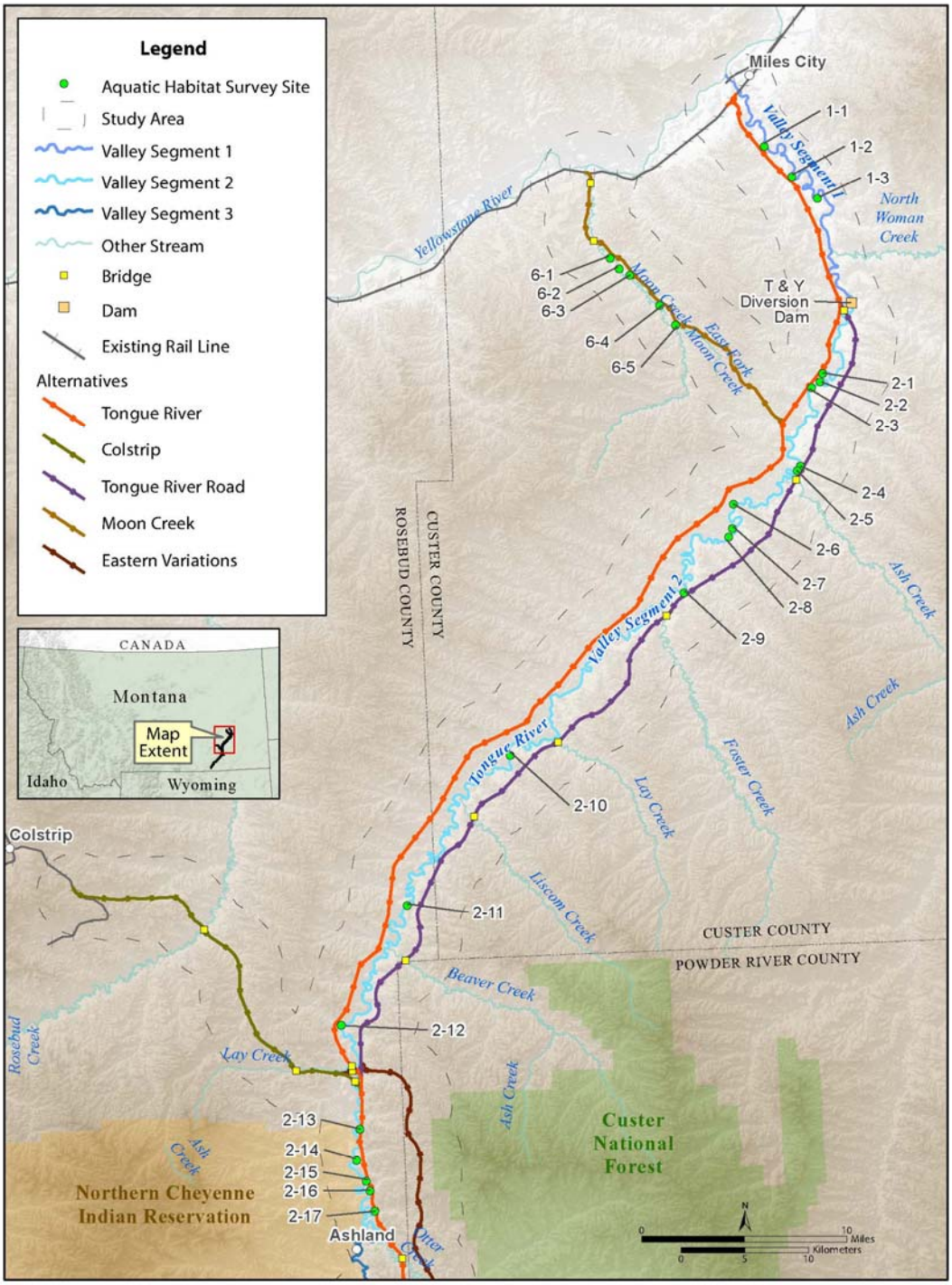

Figure 8.4-1a. Stream Habitat Survey Locations

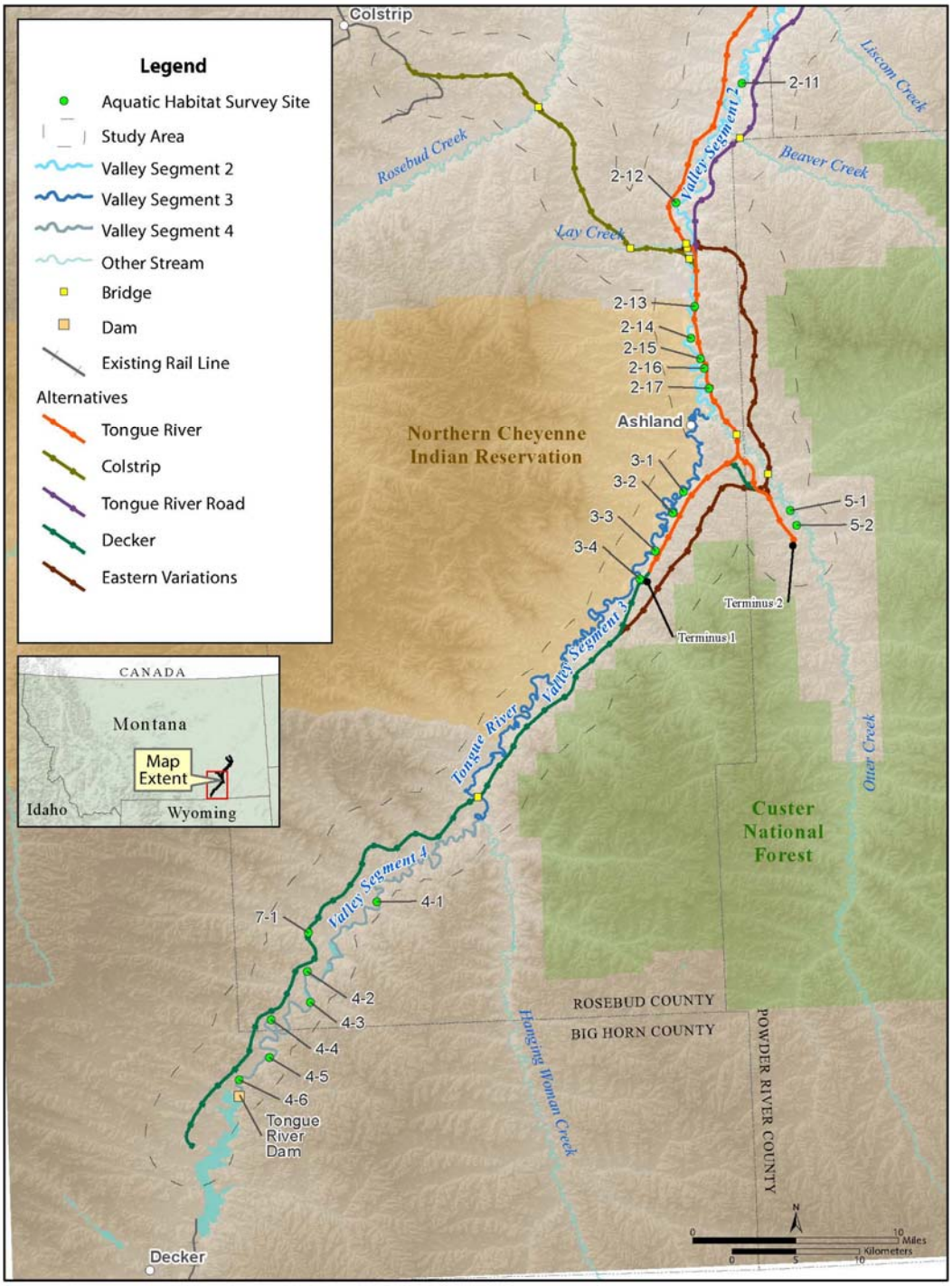

Figure 8.4-1b. Stream Habitat Survey Locations

The intent of the habitat surveys was to collect data where segments of fish-bearing streams would intersect a build alternative (i.e., 985 feet upstream and downstream of the crossing) or come within 985 feet of a build alternative (i.e., flowing parallel or adjacent to a build alternative). Where access to parcels was prohibited at stream intersections or where streams would be within 985 feet of a build alternative, OEA surveyed those streams at the next-closest accessible parcel to obtain a representative sample of habitat conditions. Habitat survey sites are shown in Figures 8.4-1a and 8.4-1b.

Land Access

One hundred fifty public and privately owned properties abut fish-bearing streams in the study area. OEA was granted access to 50 of these properties, distributed throughout the study area with generally good access to the Tongue River and Moon Creek. OEA surveyed 38 sites that were distributed across 25 properties (Figures 8.4-1a and 8.4-1b). These sites were selected because they are within 985 feet of a build alternative and representative of the rivers and streams that are likely to be affected. Of these sites, 30 were located on the Tongue River, five on Moon Creek, two on Otter Creek (a large tributary to the Tongue River), and one on Canyon Creek (a small tributary to the Tongue River). OEA did not need to access all 50 accessible properties to describe fish habitat in the study area adequately.

Five known or potential fish-bearing streams (Beaver, Foster, Ash, Bull, and Rosebud Creeks) that would be affected by certain build alternatives could not be surveyed because landowners did not permit access. OEA characterized conditions in these fish-bearing streams at points where the channel could be viewed from a public area, such as from a public road that crosses the fish-bearing stream. OEA also characterized the habitat conditions using data from surveyed streams with comparable features, such as the amount of land area drained, channel width, and channel steepness.

Surveyed Streams

OEA surveyed a minimum of 500 meters of stream at each survey site. Table 8.4-1 identifies the streams that OEA surveyed, including the length of stream in the 2-mile study area, the length of stream within 985 feet of a build alternative, and the length of the surveyed portion of the stream. Nationally standardized habitat survey protocols recommend a survey reach length of 985 feet (300 meters) or at least 20 times the mean wetted channel width in each channel segment to provide a representative sample of habitat types and habitat conditions (Fitzpatrick et al. 1998). The combined length of channel surveyed by OEA exceeded these requirements substantially in each of the seven channel segments identified in Section 8.4.2, *Affected Environment*. In other words, the surveyed locations provided a representative characterization of the quantity and quality of river and stream habitat available to fish in locations that could be affected by the build alternatives.

Table 8.4-1. Surveyed Streams in the Study Area

Stream	Stream Length in the 2-mile Study Area (miles)	Stream Length within 985 feet of a Build Alternative (miles)	Length of Stream Surveyed in 2-mile Study Area (miles)
Tongue River	202.1	13.5	9.9
Otter Creek	27.8	4.2	0.4
Moon Creek	24.4	8.0	1.4
Canyon Creek	6.7	0.5	0.6
Total	261.0	26.2	12.3

8.4.2.3 Fish Habitat Potential and Fish Presence

OEA obtained information on fish distribution from an online database of fish survey data available on the Montana FWP website (Montana Fish, Wildlife & Parks 2013). Not every stream in the study area has been surveyed by Montana FWP for fish presence or absence so these data are not definitive. Presence/absence surveys have been conducted in 15 streams in the study area, documenting fish presence in 10 streams (Table 8.4-2). Five streams were dry at the time of the Montana FWP survey, but this does not necessarily preclude fish use during high flow events (spring snowmelt or large rainstorms) when these streams are temporarily inundated. OEA obtained additional information for characterizing these streams from a drainage area and channel length analysis. OEA also used aerial photograph interpretation to determine if a given stream meets the following Montana FWP criteria for potential fish-bearing intermittent streams.

- The presence of a defined confluence connecting the stream to fish-bearing waters (the channel does not disappear when it flows onto the floodplain of a perennial fish-bearing stream).
- The presence of defined channel bed and banks over the majority of stream length between a perennial stream confluence and the nearest stream crossing by any build alternative.
- A build alternative stream crossing within 2 stream miles of a perennial stream confluence, the upstream limit of potential fish habitat in intermittent streams.

OEA applied these criteria to streams in the 1:24,000 scale National Hydrography Dataset using a geographic information system (GIS)-based analysis of stream length and aerial photograph interpretation. OEA also used visual surveys of 66 smaller streams visible from public road crossings to identify indicators of a stream's potential to support fish, and obtain information about habitat characteristics in known fish-bearing streams that were otherwise not accessible. The methods used to characterize fish habitat are described in in Appendix K, *Fish Resources*.

OEA used a fish community classification system to identify the probable distribution of species likely to occur in fish-bearing streams in the study area where Montana FWP has not

conducted fish presence/absence surveys. This classification system organizes rivers and streams based on habitat characteristics and the typical fish species they support. The fish species are subdivided into functional groups, or guilds, based on habitat preferences and feeding requirements. This classification system also defines certain ecological parameters for specific *indicator species*,[1] such as tolerance for ecological disturbance. This classification system, developed by the Montana Natural Heritage Program (Stagliano 2005), is discussed in Appendix K, *Fish Resources*. OEA then compared the observed occurrence of these species with their predicted occurrence in surveyed tributaries to refine stream type classifications.

Table 8.4-2 and Figures 8.4-1a and 8.4-1b identify streams that were documented as fish-bearing and those that were assumed to be fish-bearing based on the criteria identified above. As shown, OEA identified 63 known or likely fish-bearing streams in the study area, 41 of which are crossed by one or more of the build alternatives at one or more locations.

Table 8.4-2. Fish Distribution in Streams in the Study Area

Stream	Drainage Area (acres)	Fish Use[a]
Tongue River	3,459,288	Documented
Rosebud Creek	836,497	Documented
Otter Creek	455,228	Documented
Pumpkin Creek[b]	448,965	Documented
Hanging Woman Creek[b]	301,933	Documented
Foster Creek	74,410	Documented
Beaver Creek	58,998	Documented
Moon Creek	52,961	Documented
Ash Creek	47,144	Drainage area
Cook Creek[b]	40,044	Documented
Home Creek[b]	37,788	Documented
Canyon Creek	32,257	Likely
North Woman Creek[b]	31,937	Documented
Liscom Creek	30,420	Likely
O'Dell Creek [b]	29,680	Likely
Lay Creek	25,647	Likely
Mill Creek [b]	23,021	Likely
Logging Creek [b]	22,897	Likely
Tie Creek [b]	22,348	Likely
Greenleaf Creek [b]	20,055	Likely
Sixmile Creek	16,091	Likely
Prairie Dog Creek	15,489	Likely
Haddow Creek	12,979	Likely
Stebbins Creek	12,854	Likely
Poker Jim Creek	12,806	Likely

[1] Terms italicized at first use are defined in Chapter 25, *Glossary*.

Stream	Drainage Area (acres)	Fish Use[a]
Nelson Creek	11,882	Likely
Reservation Creek [b]	11,863	Likely
South Fork Cow Creek [b]	11,218	Likely
Pratt Creek	10,649	Likely
Miller Creek	10,319	Likely
Bring Off Creek [b]	8,273	Likely
Roe and Cooper Creek	8,273	Likely
Kelty Creek [b]	8,256	Likely
Brown Creek [b]	8,031	Likely
Jack Creek [b]	8,031	Likely
Elk Creek [b]	7,265	Likely
Stony Creek [b]	7,265	Likely
Dry Creek (North) [b]	7,087	Likely
Cow Creek (on Moon Creek Rd)	7,022	Likely
Coon Creek [b]	6,694	Likely
Dry Creek (South)	4,838	Likely
Bridge Creek [b]	--	Likely
Black Eagle Creek		Likely
Circle L Creek	--	Likely
Kennedy Creek	--	Likely
Paddy Fay Creek	--	Likely
Pump Creek	--	Likely
Thorpe Creek	--	Likely
Whitten Creek	--	Likely
Wolf Creek	--	Likely
Yank Creek	--	Likely
Horse Creek	--	Likely
King Creek	--	Likely
Lay Creek	--	Likely
Miles Creek	--	Likely
8 unnamed tributaries	--	Likely

Notes:
[a] *Documented* designates streams that have been surveyed by Montana FWP and where fish were present. *Drainage Area* designates streams where surveys have not been performed by Montana FWP but fish presence is assumed based on the drainage area, which is greater than 30,000 acres.
[b] These streams are in the study area but would not be intersected by a build alternative
Montana FWP = Montana Fish, Wildlife & Parks

8.4.2.4 Impact Analysis

OEA assumed that the entire right-of-way would be disturbed during rail construction by vegetation clearing, excavation, and the placement of fill material. Some areas would be permanently disturbed (i.e., the rail line footprint), and some areas would be temporarily

disturbed. It is unlikely that the entire right-of-way would be disturbed during construction (the exact locations of permanent and temporary disturbance within the right-of-way would be determined during final engineering and design). Therefore, OEA's assumption that the entire right-of-way would be disturbed most likely overestimates the impacts on fish and fish habitat. To assess impacts, OEA identified the fish species that are likely to occur in each ecosystem type using species *assemblages* (groups of fish that depend on the same habitat) associated with each aquatic habitat type. This method follows the aquatic habitat classification system developed for the State of Montana by Stagliano (2005).

For each build alternative, OEA calculated the number of fish-bearing streams that would be intersected by that alternative and the length of right-of-way that would occur within 985 feet of a fish-bearing stream. Those build alternatives that would cross more fish-bearing streams, have multiple crossings of a fish-bearing stream, or have a greater length of right-of-way within 985 feet of a fish-bearing stream are likely to affect more fish and fish habitat than build alternatives with fewer crossings and less right-of-way adjacent to fish-bearing streams. TRRC's list of proposed bridges indicates that all perennial fish-bearing streams would be crossed with bridges, while intermittent fish-bearing streams would be spanned with culverts. All bridges would be free-span bridges (e.g., they would span the entire channel with no structures placed in the channel), with the possible exception of the bridge over the Tongue River that would be required for either of the Decker Alternatives (detailed engineering and design would be required to determine the ultimate bridge design). All culverts crossing fish-bearing streams would be designed to provide fish passage consistent with state permitting requirements.

Species addressed in this chapter are generally considered common; populations are secure and not assumed to be vulnerable to decline. Species that are designated as at risk or populations that have been identified as declining are defined as special-status species and are discussed in Section 8.5, *Special-Status Species.* Those special-status fish are the pallid sturgeon, paddlefish, sturgeon chub, sauger, and blue sucker.

8.4.3 Affected Environment

The Tongue River watershed encompasses approximately 5,398 square miles (3.5 million acres) in Wyoming and Montana. The headwaters originate in north-central Wyoming, in the Big Horn Mountains, and flow northeast into southeastern Montana. Approximately 70 percent of the watershed (3,781 square miles) is in Montana, while 30 percent (1,618 square miles) is in Wyoming. Major tributaries of the Tongue River include Pumpkin, Otter, Hanging Woman, Prairie Dog, and Goose Creeks. The Tongue River Dam and Reservoir are located approximately 10 miles downstream (north) of the Wyoming-Montana state line. The section of the Tongue River between the Tongue River Dam and the river's confluence with the Yellowstone River is characterized by four general *geomorphic* terrains. Bisson and Montgomery (1996) refer to such geomorphic regions as *valley segments* that share similar geomorphic properties as well as hydrologic and sediment transport characteristics (Table 8.4-3). The valley segments are used as a basis for

determining the number and distribution of survey sites needed to obtain a representative sample of habitat conditions in the study area, consistent with nationally standardized stream habitat survey guidelines (Fitzpatrick et al. 1998).

OEA subdivided the Tongue River component of the study area into four valley segments for surveying to account for differences in river habitat conditions caused by the surrounding landscape and different land and water uses. As shown in Table 8.4-3, the four valley segments in the study area differ in terms of floodplain width, *sinuosity*, surrounding *channel geology*, and, to a lesser degree, *flow regime* and water clarity. The valley segments are located as follows (Figures 8.4-1a and 8.4-1b):

- **Segment 1** extends from the point at which the Tongue and the Yellowstone Rivers meet at Miles City, Montana, to approximately 12 miles upstream to the Tongue River Diversion Dam on the Tongue River.
- **Segment 2** extends from the Tongue River Diversion Dam to where the Tongue River meets Otter Creek near Ashland, Montana.
- **Segment 3** extends from where the Tongue River meets Otter Creek to where it meets Hanging Woman Creek near Birney, Montana, passing through what is locally called the Tongue River Breaks.
- **Segment 4** extends from where the Tongue River meets Hanging Woman Creek to the Tongue River Reservoir, a section known locally as the prairie canyon.

These segments are defined primarily by differences in surrounding geology and topography. The Tongue River transitions from a narrow, incised valley with steep surrounding hillslopes near the Tongue River Dam to an increasingly broad and flat river valley as it approaches its confluence with the Yellowstone River. The channel and immediate floodplain lie in Quaternary Alluvium and Quaternary Terrace deposits composed of gravel, sand, silt, and clay. The geology of the surrounding valley is composed of a mixture of sandstone, coal deposits, and clinker, also referred to as scoria, pumice, or floatstone. The Quaternary alluvial deposits are up to 15 meters (50 feet) thick in Segments 1 and 2 and up to 11 meters (35 feet) thick in Segments 3 and 4. Quaternary terrace deposits are prevalent in Segments 1 and 2 but become less extensive upstream in Segments 3 and 4 as the valley narrows and the surrounding rock formations encroach on the river channel (Chapter 13, Section 13.2 *Geology, Soils, and Paleontological Resources*: Figures 13-2a and 13-2b). Segments 1 and 2 are geologically similar but have substantially different flow conditions due to regular irrigation water withdrawals at Tongue River Diversion Dam. The diversion dam is defined as the boundary between these two segments.

Table 8.4-3. Characteristics of Tongue River Channel Segments in the Study Area

Segment/ Length	Valley Type (colluvial, alluvial, or bedrock)	Valley Form[a, b] (confined, moderately confined, or unconfined)/Average Floodplain Width	Channel Gradient (%)	Channel Pattern (straight, meandering, braided, multiple channels)	Sinuosity[c]	Other
1/34 km	Alluvial	Unconfined/1,780 m[d]	0.08	Meandering	Sinuous (1.6)	Considerably less streamflow because of Tongue River Diversion Dam[e]
2/158 km	Alluvial	Unconfined/1,210 m	0.09	Meandering	Meandering (1.8)	Generally turbid
3/79 km	Alluvial	Unconfined/988 m	0.08	Meandering	Meandering (2.2)	Many fast-water habitats
4/55 km	Alluvial	Unconfined/521 m	0.14	Meandering, with locally straight reaches	Sinuous (1.5)	Water clarity is moderate to good due to effects of Tongue River Dam/ Reservoir and lack of significant tributary influence; extensive algal growth on channel bed

Notes:

[a] Valley form (confinement) is defined here as the ratio of the bankfull width to the width of the former/current floodplain between bedrock valley walls. Bankfull width is the width of the channel at the point at which overbank flooding begins; often occurs as flows reach the 1.5-year recurrence interval level. Unconfined is when the floodplain is greater than four times the bankfull width, moderately confined is when the floodplain is greater than two but less than four times the bankfull width, and confined is when the floodplain is less than two times the bankfull width (Watershed Professionals Network 1999).

[b] Field data were supplemented with other channel morphology data, specifically bankfull width dimensions, as reported by Chase (2004)

[c] Sinuosity is defined as the ratio of actual channel distance between identified points compared with straight/down-valley distance, straight is defined by a ratio of 1, slightly sinuous is defined by a ratio of 1.1–1.3, sinuous is defined by a ratio of 1.4–1.7, and meandering is defined by a ratio of 1.8 and above.

[d] Excluding the Tongue River near Miles City, Montana, downstream of Interstate 84

[e] Also known as the T & Y Diversion Dam or the Twelve Mile Dam

km = kilometers; m = meters

As shown in Table 8.4-4 and Figures 8.4-1a and 8.4-1b, there are four *mainstem* Tongue River and three tributary survey segments, with 38 surveyed sites located in the study area. Survey sites are named sequentially by the segment in which they occur. Each survey site was approximately 1,640 feet in length. As noted previously, standardized habitat survey protocols for wadeable streams recommend a survey length of at least 985 feet in each channel segment to provide a representative sample of habitat conditions (Fitzpatrick et al. 1998). OEA surveyed additional sites in each channel segment to obtain more data on river and stream habitats within 985 feet of a proposed right-of-way.

Table 8.4-4. Survey Sites and Valley Segment Locations

Mainstem Tongue River Survey Sites				
Segment 1	**Segment 2**		**Segment 3**	**Segment 4**
1-1[a]	2-1	2-10	3-1	4-1
1-2	2-2	2-11	3-2	4-2
1-3	2-3	2-12	3-3	4-3
	2-4	2-13	3-4	4-4
	2-5	2-14		4-5
	2-6	2-15		4-6
	2-7	2-16		
	2-8	2-17		
	2-9			
Tributary Survey Sites				
Segment 5	**Segment 6**		**Segment 7**	
5-1 (Otter Creek)	6-1 (Moon Creek)		7-1 (Canyon Creek)	
5-2 (Otter Creek)	6-2 (Moon Creek)			
	6-3 (Moon Creek)			
	6-4 (Moon Creek)			
	6-5 (Moon Creek)			

Note:
[a] The first number of the survey site identifies the valley segment, and the second number identifies the survey site within the valley segment. See Figures 8.4-1a and 8.4-1b for these survey site locations.

8.4.3.1 River and Stream Habitat Survey Results

The following discussion summarizes the results of the river and stream habitat surveys completed on the Tongue River and the smaller tributary streams. Additional information regarding river and stream habitat surveys and summaries of the data collected within each segment is provided in Appendix K, *Fish Resources*.

Fish Habitat Conditions in the Tongue River

Complexity

OEA surveyed habitat at 30 sites in the Tongue River valley segments (Table 8.4-4 and Figures 8.4-1a and 8.4-1b). Valley Segment 2 has the most habitat complexity, with 16.7 habitat units (i.e., *pool*, *riffle*, *glide*, and *run*) per kilometer. Valley Segment 2 also has the most area and length surveyed, with values of 340,413 square meters and 9,057 meters, respectively. Valley Segment 4 has the least habitat complexity, with 4.8 habitat units per kilometer. On average, for all sites that were physically surveyed, the Tongue River has approximately 12 habitat units per kilometer. Glides are the dominant habitat unit in each valley segment, followed by riffles, except in Valley Segment 3, where pools are the secondary habitat unit. The surveys indicate that sediment delivery and transport in the Tongue River may be in equilibrium (i.e., material eroded from the channel is replaced with deposited material at a relatively equal rate, resulting in a stable river channel that is not prone to rapid change. In stable channels, natural processes continually create new habitats while replacing existing ones, maintaining a consistent quantity and diversity of habitats for fish over time.

Width

Average *bankfull width* (width when channel is at flow capacity) and *wetted width* (width of the wetted channel at the time of survey) generally increase in the downstream direction, which is a common phenomenon in large river systems (Schumm 1977). An exception to this is Valley Segment 4 (below the Tongue River Dam and Reservoir), which has average bankfull width and average wetted width values closer to that of Valley Segment 1. This can be attributed to either the presence of the Tongue River Dam and Reservoir, the geology and associated gradient of the river channel, or both.

Riparian Vegetation

Riparian vegetation is dominated by grasses and open field, except in Valley Segment 3 where shrubs dominate. Shrubs are the second-most dominant riparian type, followed by trees. Bank heights generally remain similar in the downstream direction (with a combined left and right bank average of approximately 3.2 meters). The streambanks in Valley Segment 1 are considerably higher than in the other valley segments (with a combined left and right bank average of 3.5 meters).

Bank Stability and Habitat

There is a clear correlation between location and extent of bank instability in the study area and the percentage of eroding banks increasing significantly in the downstream direction (from 12.1 percent for both banks combined in Valley Segment 4 to 46.3 percent combined for both banks in Valley Segment 1). Thus, as the Tongue River flows downstream and becomes larger, banks become increasingly unstable. This shift is attributable to differences

in geomorphic conditions and land use patterns between segments and the presence of the Tongue River Dam. The dam moderates spring peak flows in Valley Segment 4, thereby reducing the potential for bank erosion.

Finally, there is a clear correlation between the presence and extent of *undercut* banks in the study area. In prairie ecosystems, undercut stream banks provide cover for fish and are an important habitat feature if a relatively stable balance is maintained between the formation of undercut bank features and their eventual collapse. The presence of extensive undercutting can indicate unstable conditions for fish where riparian vegetation (large trees) is not sufficient to maintain bank stability. In contrast, a lack of undercutting can also indicate active bank erosion and unstable channel conditions. Regulated hydrologic regimes can influence the extent of undercutting by reducing peak flows and moderating the erosive forces working on the stream banks, thereby maintaining more undercutting than would occur naturally. Flow regulation by the Tongue River Dam is at least partly responsible for the greater extent of undercut banks in Valley Segment 4 than in downstream segments that receive an increasing amount of inflow from unregulated tributaries. The percentage of undercut banks decreases significantly in the downstream direction from the Tongue River Dam (from 33.1 percent combined for both banks in Valley Segment 4 to 6.7 percent combined for both banks in Valley Segment 1). The decrease in undercut banks correlates with and is directly related to an observed increase in bank instability.

The extent of backwater habitats is limited in the Tongue River because of natural and human factors. Lack of backwater habitats can reflect a system that is experiencing ongoing *aggradation* (deposition that results in the rise of the channel bed elevation), or has artificially modified flow conditions. In the case of Valley Segment 1 and Valley Segment 4, the Tongue River Diversion Dam and the Tongue River Dam, respectively, modify stream flows and trap sediment, limiting the system's ability to create and maintain backwater habitats. In contrast, Segments 2 and 3 receive large sediment inputs, resulting in an increased rate of aggradation with distance downstream from Segment 4. This results in depositional areas that raise the channel bed, increasing flow energy against the streambanks, accelerating bank erosion, and leading to the loss of stable habitat conditions. Sediment accumulation in the lower Tongue River (also affected by livestock grazing and agricultural activity) has caused a significant increase in the rate of active bank erosion and a decrease in the percentage of undercut bank habitat downstream.

These natural and human factors also influence the composition of the channel bed. In general, Segment 4 has the lowest proportion of fine-grained sediments in the channel substrate, primarily due to the sediment-trapping effects of the Tongue River Reservoir. The proportion of fine sediments in bed substrates increases downstream in Segments 2 and 3, with larger and finer-grained bar complexes and islands becoming more prevalent. Also, average streamflow decreases in Valley Segment 1 because of irrigation water withdrawals at Tongue River Diversion Dam. These withdrawals reduce spring peak flows in Segment 1 and regularly dewater portions of the segment during summer months. Dewatering has been exacerbated by a combination of drought conditions and the accumulated water withdrawals

throughout the Tongue River Watershed in Montana and Wyoming. These flow modifications affect the ability of the river to transport fine sediments through the segment, altering both the aggradation rate and the composition of sediments in the channel bed.

Fish Habitat Conditions in Tributary Streams

OEA surveyed fish habitat conditions in three tributary streams (Moon, Otter, and Canyon Creeks). Table 8.4-1 provides the extent of tributary streams and habitat that OEA physically surveyed in the study area.

Otter Creek has the least habitat complexity of any of the tributary streams (19.7 habitat units per kilometer, compared with an average of 37 for all surveyed sites). Glides are the dominant habitat unit in each tributary. Average bankfull width ranges from 4 to 6 meters, and average wetted width ranges from 2.5 meters on Canyon Creek to 5 meters on Otter Creek. Bank heights are similar across tributaries, with values of either 1 or 2 meters for each bank. Bank instability is generally high for each tributary, especially on Moon and Canyon Creeks. Undercut banks are absent on Otter Creek, while approximately 10 percent of the surveyed length of both Moon and Canyon Creeks have undercut banks. Substrate composition is dominated by fine sediments.

Most of the tributaries are incised and actively eroding. They lack a substantial amount of vegetative growth on the banks and are negatively affected by cattle trampling on the banks and in the channel. Riparian vegetation composition is dominated by grasses and open field, followed by shrubs and trees.

Fish Distribution

Table 8.4-5 lists the fish species that are known or assumed to occur in the study area. The list of fish species is based on documented occurrences by Montana FWP. The assumed occurrences are based on the habitat conditions in the streams and the fish assemblages associated with those habitats (Section 8.4.2.3, *Fish Habitat Potential and Fish Presence*). Of the 49 species of fish in the study area, 31 are native fish species and 18 are nonnative species. These species are generally typical of fish that are found in streams of similar size and under similar habitat conditions. Five of the native species are species of concern: including pallid sturgeon, paddle fish, sturgeon chub, sauger, and blue sucker. Classification parameters and additional information on these representative or indicator species, as well as the species assemblages and associated habitat types, are provided in Appendix K, *Fish Resources*.

Table 8.4-5. Species Known or Assumed to Occur in the Study Area

Species	Tongue River	Rosebud Creek	Moon Creek	Otter Creek	Pumpkin Creek	Hanging Woman Creek	Home Creek	Foster Creek	Beaver Creek	Ash Creek	N. Woman Creek
Bigmouth buffalo (*Ictiobus cyprinellus*)	●										
Black bullhead (*Ameiurus melas*)	●	●	●	●	●	●					●
Black crappie (*Pomoxis nigromaculatus*)	●					●					
Blue sucker (*Cycleptus elongates*)[a]	●										
Bluegill (*Lepomis macrochirus*)						●					
Brassy minnow (*Hybognathus hankinsoni*)	●	●	●	●	●	●		●	●		●
Brook stickleback (*Culaea inconstans*)	●	●	●	●	●	●					●
Brook trout (*Salvelinus fontinalis*)		●									
Brown trout (*Salmo trutta*)	●										
Burbot (*Lota lota*)	●										
Channel catfish (*Ictalurus punctatus*)	●	●	●	●	●	●		●			
Common carp (*Cyprinus carpio*)	●	●	●	●	●	●		●			●
Creek chub (*Semotilus atromaculatus*)	●	●		●							
Emerald shiner (*Notropis atherinoides*)	●				●	●					
Fathead minnow (*Pimephales promelas*)	●	●	●	●	●	●	●	●	●	●	●
Flathead chub (*Platygobio gracilis*)	●	●	●	●	●	●	●	●	●	●	●
Freshwater drum (*Aplodinotus grunniens*)	●										
Golden shiner (*Notemigonus crysoleucas*)	●			●		●					
Goldeye (*Hiodon alosoides*)	●	●		●	●				●		
Green sunfish (*Lepomis cyanellus*)	●	●	●	●	●	●		●			
Lake chub (*Couesius plumbeus*)	●	●	●	●	●	●	●	●	●	●	●
Largemouth bass (*Micropterus salmoides*)	●										
Longnose dace (*Rhinichthys cataractae*)	●	●	●	●	●	●	●	●	●	●	●
Longnose sucker (*Catostomus catostomus*)	●	●			●						
Mountain sucker (*Catostomus platyrhynchus*)	●										
Northern pike (*Esox lucius*)	●	●	●	●	●	●					●
Paddlefish (*Polyodon spathula)*[a]	●										
Plains killifish (*Fundulus zebrinus*)	●	●	●								
Plains minnow (*Hybognathus placitus*)	●	●	●	●	●	●					●
Pumpkinseed (*Lepomus gibbosus*)	●			●		●					
Rainbow trout (*Oncorhynchus mykiss*)	●										
River carpsucker (*Carpiodes carpio*)	●	●									
Rock bass (*Ambloplites rupestris*)	●			●		●					
Sand shiner (*Notropis stramineus*)	●	●	●	●	●	●					●
Sauger (*Sander canadense*)[a]	●	●			●	●					
Shorthead redhorse (*Moxostoma macrolepidotum*)	●	●		●	●	●					
Shovelnose sturgeon (*Scaphirhynchus platorynchus*)	●										
Sicklefin chub (*Machybopsis meeki*)[a]	●										

Species	Tongue River	Rosebud Creek	Moon Creek	Otter Creek	Pumpkin Creek	Hanging Woman Creek	Home Creek	Foster Creek	Beaver Creek	Ash Creek	N. Woman Creek
Smallmouth bass (*Micropterus dolomieu*)	●										
Smallmouth buffalo (*Ictiobus bubalus*)	●			●	●	●					
Spottail shiner (*Notropis hudsonius*)	●										
Stonecat (*Noturus flavus*)	●	●	●	●	●	●		●			●
Sturgeon chub (*Macrhybopsis gelida*)[a]	●										
Walleye (*Sander vitreum*)	●	●		●		●					
Western silvery minnow (*Hybognathus argryitis)*	●		●	●					●		
White crappie (*Pomoxis annularis*)	●	●		●		●					
White sucker (*Catostomus commersoni*)	●	●	●	●	●	●	●	●	●	●	●
Yellow bullhead (*Ameiurus natalis*)	●	●		●	●						
Yellow perch (*Perca flavescens*)	●	●				●					

Notes:

[a] These species are identified as species of concern by the Montana Natural Heritage Program. For further information on species of concern, refer to Section 8.5, *Special-Status Species.*

Source: Documented species occurrences based on Montana Fish, Wildlife & Parks (2013) data and assumed species occurrence, as derived using methods described by Stagliano (2005).

8.4.4 Environmental Consequences

Impacts on fish could result from construction and operation of any build alternative. The impacts common to all build alternatives are presented first, followed by impacts specific to the build alternatives.

8.4.4.1 Impacts Common to All Build Alternatives

Construction

The build alternatives would cross fish-bearing streams with culverts or free-span bridges (bridges would span the entire channel with no structures placed in the channel), with the possible exception of the bridge over the Tongue River, which would be required for either of the Decker Alternatives (detailed engineering and design would be required to determine structural requirements). The proposed rail line would be designed to meet the requirements of the Montana Stream Protection Act requirements, which would include fish passable structures at fish-bearing stream crossings. Bridge and culvert construction could increase *turbidity* and sedimentation in streams, release hazardous materials into streams, temporarily and permanently remove riparian vegetation, and injure or crush fish. Construction of tracks within 985 feet of fish-bearing streams could cause an increase in turbidity and sedimentation in streams, remove riparian vegetation, and release hazardous materials into streams.

The following construction impacts are common to all build alternatives.

- **Cause Mortality from Instream Construction**

  Construction of any build alternative could cause direct mortality of fish if activities occur in a stream when fish are present. Use of construction equipment in active stream channels could injure or crush eggs, larvae, and juvenile fish in or downstream of the construction site. Construction equipment could compact soils and substrate in the streambed, resulting in the death of larval fish and eggs in or on substrate material. In areas where there is a soft sediment bottom, equipment movement could redirect streamflow. Portions of the streambed could become dry and isolated, resulting in mortality of fish. Water diversions and temporary *dewatering* could affect developing eggs and preemergent larvae through desiccation or freezing. Eggs, larvae, and juvenile fish would be more susceptible to harm from instream construction because they are immobile or less mobile. Adult and larger juvenile fish are capable of moving away from disturbance and would be expected to avoid exposure where possible. Adult and larger fish that are restricted to intermittent pools and unable to escape disturbance could also be injured or killed. Eggs and larvae of nest-guarding species (i.e., fish that guard their eggs and young against predation) may face increased risk of mortality if adults are driven away by disturbance.

  Fish exposure to injury or mortality would vary considerably, depending on the species, their age, and size at the time of the impact, and the specific type of habitat that would be affected. For example, fish that are in isolated pools in intermittent streams would be unable to escape from sedimentation or direct physical injury from habitat disturbance by heavy equipment. Fish species that are likely to be found in these habitats include brook stickleback, brassy minnow, fathead minnow, and lake chub from the minnow family. In flowing water habitats, exposure to these effects would vary, depending on the life stages that would be exposed to the stressor. For example, several fish species, such as the white sucker, shovelnose sturgeon, blue sucker, river carpsuckers, rock bass, and fathead minnow, have adhesive eggs that stick to the substrate during incubation. Eggs that are present during dewatering or other in-channel construction activities would most likely not survive. Some assemblage indicator species either nest or have otherwise immobile eggs and/or immobile larvae, while the eggs and larvae of other species drift freely with the current. These include representatives of the suckers (white sucker, blue sucker, river carpsucker), shovelnose sturgeon, minnows (western silvery minnow, emerald shiner, fathead minnow), catfish (stonecat and channel catfish), bass and sunfish, and sauger.

- **Block Fish Movement**

  Construction of any build alternative would require installing bridges at all fish-bearing stream crossings. Bridge construction activities adjacent to the stream could result in temporary barriers to fish passage. Bridge construction could also increase the delivery of fine sediment to affected streams, either by exposing erodible surfaces, channeling ditch runoff to the streams, or increasing stream power because of potential changes in runoff patterns. Changes in runoff patterns could cause stream channel instability,

scoured streambanks, and increased turbidity, thereby altering fish habitat and fish behavior.

Bridge construction over smaller tributary streams could require temporary streamflow diversions where water is bypassed around the bridgework area with a pipe and pump system, but such flow diversions are likely to be impractical over larger channels such as the Tongue River and Rosebud Creek. In these instances, a *cofferdam* may be necessary to isolate partially a dry, instream work area. Flow bypasses may also alter local flow and hydraulic conditions enough to modify fish behavior or make existing habitats temporarily unsuitable.

Several fish species in the study area migrate locally or over considerable distances between normal rearing and spawning habitats. These include, but are not limited to, the following species.

- Shovelnose sturgeon: Highly migratory during spawning and larval dispersal.
- Goldeye: Highly migratory during spawning.
- Sauger: Highly migratory during spawning, larval dispersal by currents.
- Shorthead redhorse: Locally migratory during spawning.
- White sucker: Locally migratory during spawning.
- Plains minnow: Dependent on downstream dispersal of eggs and larvae.
- Flathead chub: Locally migratory during spawning.
- Sand shiner: Locally migratory during spawning.
- Stonecat: Locally migratory between summer and winter habitats.
- River carpsucker: Highly migratory during spawning.

Sturgeon and sauger are typically associated with rivers or larger creeks, habitat types that would most likely not be subject to temporary passage barriers. The remaining species are associated with smaller tributary streams and would be susceptible to temporary upstream and possibly downstream passage delay or blockages during bridge construction, impacts that would occur only during a species' migratory period. Most indicator species migrate from spring to early summer with the spring snowmelt.

Pumped diversions may be used for flow bypasses on smaller streams. Species that are dependent on currents for the dispersal of eggs and larvae (e.g., shovelnose sturgeon, sauger, plains minnow) would be subject to mortality from *entrainment* or *impingement* in the diversion pumps or on their screens. Plains minnow are an indicator species, with eggs and larvae that are dispersed by currents.

Certain indicator species, specifically sand shiner and flathead chub, spawn later in the summer under lower flow conditions. Exposure to temporary passage barriers would be likely. The stonecat migrates locally between summer and winter rearing habitats and

would be susceptible to barrier conditions during lower water periods in the fall. These three indicator species are found in the small streams (Moon and Otter Creeks) and would be affected by construction.

Culvert crossings of fish-bearing streams could impede fish movement if culverts are not designed properly. Common issues with culverts that restrict fish movement include increased water velocity, decreased water depth, and culvert outlet drop heights. Impeding fish movement blocks access to upstream habitats that could be important for spawning and other life stages. Prairie streams and other small tributaries of the Tongue River, including intermittent and ephemeral creeks, provide critical spawning and recruitment habitat for many of the native minnow and sucker species. Even ephemeral creeks that flow for only a few weeks during spring snowmelt or rain showers are used by many of the prairie fish species for spawning and rearing. These small tributaries produce a substantial amount of the forage base for predatory fish species in the Tongue and Yellowstone Rivers. Maintaining longitudinal connectivity to these waters is critical for recruitment and sustaining these fish populations in the Tongue and Yellowstone Rivers. However, the proposed rail line would be designed to meet the requirements of the Montana Stream Protection Act requirements, which would include fish-passable structures at fish-bearing stream crossings.

- **Contribute to Fish Stranding and Injury from Temporary Stream Dewatering**

  Construction of any build alternative could require development of temporarily dewatered work areas for bridge installations on streams, construction of bridge abutments, bank-engineered structures, culvert installation, and other activities associated with stream crossings. These activities would require cofferdams, stream diversions, or similar features as well as dewatering of river and stream habitats that are occupied by fish. Although fish removal and relocation would avoid and minimize harm, some fish injury and mortality is expected to occur. The primary cause of harm associated with work-area dewatering is the incidental stranding of fish in dewatered work areas. Fish left inside the work area would most likely be killed by dewatering or construction activities in the work area (see the *Cause Mortality from Instream Construction* impact, above). Fish may be injured during removal and relocation. Survival may be reduced following release in suitable habitats because of capture stress, competition with fish that occupy those habitats, and increased vulnerability to predation.

- **Cause Sedimentation and Turbidity**

  Construction of any build alternative could increase sedimentation and turbidity in all streams where stream crossings are required, which would affect fish physiology, behavior, and habitat suitability. These impacts would occur at the point of construction and extend downstream at least 985 feet, depending on the size of the stream, streamflow at the time of construction, and the extent of ground disturbance and in-water

construction activities. High turbidity levels can directly affect the physical health of fish and alter fish behavior, but the severity of these impacts would vary, depending on species susceptibility. High turbidity affects gill function, blood sugar levels, and *osmoregulatory function* in fish. Behavior impacts associated with increases in turbidity include altered responses to predation risk and predator avoidance, changes in foraging ability, and reduced territoriality. Long-term impacts from chronic increases in sedimentation and turbidity include changes to spawning and rearing habitat. Several of the fish species that are known or expected to occur in the study area are adapted to high turbidity levels, and some are specialists that require elevated turbidity, such as plains minnow, goldeye, flathead chub, and emerald shiner. These species would be less susceptible to elevated turbidity, particularly if the impacts were to be short term and incapable of causing permanent habitat degradation.

Increased sediment in streams would affect juvenile fish through behavioral changes and/or reductions in food sources. Diets of many juvenile fish consist mostly of macroinvertebrates that live in the stream. Large amounts of fine sediments can reduce or eliminate suitable substrate for producing macroinvertebrates, essentially limiting food availability to juvenile fish.

In severe instances, excessive sediment delivery would modify the stream channel configuration, decreasing the depth and number of pools and reducing the physical space available for rearing fish. Such changes would lead to reduced survival of juvenile fish by filling *interstitial* spaces in streams with gravel, cobble, and boulder substrates. Some species, such as stonecat, are intolerant of high turbidity levels and depend on these interstitial spaces as juvenile and adult rearing habitat. Increases in the transport and deposition of fine sediments over time could also cause or increase *channel braiding*, increase width-to-depth ratios, increase the incidence and severity of bank erosion, reduce pool volume and frequency, and increase subsurface flow.

Fish species with low tolerance for turbidity or ecological degradation would be the most susceptible to construction-related turbidity impacts. Assemblage indicator species with low turbidity tolerance include the stonecat and longnose dace, which are likely to occur in many of the fish-bearing streams in the study area (Table 8.4-5). These species are also unable to adjust to habitat degradation, indicating that they would be particularly susceptible to impacts from elevated turbidity. Other species, including the shorthead redhorse, goldeye, and shovelnose sturgeon, have high turbidity tolerance but are intolerant of ecological degradation. These species would not be vulnerable to elevated turbidity unless the sedimentation impacts were large enough to alter habitat suitability.

- **Remove or Alter Instream and Riparian Habitats**

  Construction of any build alternative would most likely require some removal or alteration of riparian vegetation, which would influence the quality of fish habitat. Vegetation removal would expose soils to erosive forces such as wind and rain. It would

also reduce streambank stability; food production; and instream cover, complexity, and temperature in affected streams. Woody debris from streamside trees provides cover and habitat complexity, essential components of fish habitat. Riparian zones are also sources of *allochthounous* nutrients (terrestrial nutrients that are transported to the aquatic system, such as terrestrial insects and plant matter). Riparian vegetation provides shade and an insulating canopy that moderates water temperatures in both summer and winter, and creates a natural filter that reduces the transport of fine sediment to the stream. Riparian vegetation stabilizes stream banks through root cohesion, providing foraging habitat and cover for rearing fish.

Riparian inputs of allochthounous nutrients influence the aquatic food chain of a stream, providing organic detritus that contributes to food web productivity and terrestrial insects that are a direct source of food for many fish species. Riparian shading also influences aquatic productivity by limiting solar radiation inputs. Because of the numerous ways riparian vegetation influences the stream ecosystem, the impacts of altering riparian vegetation are highly variable, ranging from increased streambank erosion and instream sedimentation, to increased stream temperatures, to decreased food production and habitat complexity.

The removal of riparian vegetation would accelerate the natural processes of streambank erosion and channel meandering, increasing streambank, stream channel, and floodplain erosion as the channel migrates within its floodplain. Such an impact would most likely occur with the removal of high-quality, established riparian vegetation or a substantial quantity of riparian vegetation.

Loss of riparian cover would most likely result in a localized reduction in habitat complexity. Specifically, streamside riparian vegetation is associated with undercut banks, large woody debris jams, shading, and other forms of cover that are used extensively by several fish species that are known to occur in the study area. Stonecats and channel catfish—both indicator species in their respective assemblages—use structures associated with functional riparian conditions, including undercut banks, hollow logs, and other large woody debris as cover.

- **Degrade Water Quality**

Construction of any build alternative would require the use of several common construction materials (e.g., concrete, paint, and wood preservatives) and petroleum products (e.g., fuels, lubricants, and hydraulic fluids) that are toxic to fish and other aquatic organisms. These materials may be stored along the right-of-way or in staging areas during construction. An accidental spill of hazardous materials near a water body could reach a stream or other surface water and degrade water quality, thereby affecting the health or survival of fish and fish habitat. The nature and extent of these impacts would depend on the type and amount of material that would reach the surface waters, the timing of spill, and the ecological sensitivity of the affected habitat. Spills during the

spawning season would be particularly detrimental for nest-spawning species or species with immobile (nondrifting) eggs, but dilution by high-flow conditions, typically during the spring spawning period, could limit the duration and severity of exposure downstream of an accidental spill. Spills in low-energy environments (e.g., pool and backwater habitats) could result in long-term impacts because these environments lack flushing flows, making them less suitable for fish species.

Operation

The following rail operation impacts are common to all build alternatives. The severity of the impact would vary depending on the volume of train traffic and required maintenance.

- **Alter Stream Hydraulics**

  The bridges, bridge approaches, culverts, and erosion protection required for operation of any build alternative would extend into the *channel migration zone,* interrupting lateral channel migration, and affecting surface and subsurface flow. Bank-engineered structures could be used to protect bridge abutments and the right-of-way from erosion by channel migration. TRRC has indicated that bank-engineered structures would not be required below the ordinary high-water mark of the Tongue River for any build alternative but would be required at some bridge abutment foreslopes outside of the channel and above the ordinary high-water mark. These bank-engineered structures may be required on smaller fish-bearing streams.

  Modification of the streambank and stream channel would permanently modify habitat conditions in the footprint of the modification and alter ecological functions. The interruption of channel migration by bank-engineered structures would alter habitat-forming processes both upstream and downstream of the crossing. The resulting impacts on fish species would vary, depending on the extent to which habitat conditions are altered, the suitability of the altered habitat for the species that is likely to occur in the affected area and the sensitivity of that species to ecological disturbance (Appendix K, *Fish Resources*, provides further information on species sensitivity to ecological degradation). Certain fish species may benefit from habitat modification. Smallmouth bass prefer habitats with rocky structure and may benefit from the conversion of glide habitat to deep-scour pools with cover provided by *riprap*-protected streambanks. The creation of suitable habitat for nonnative bass could result in increased predation on or competition for prey with native fish species, thereby negatively affecting those other fish.

- **Cause Sedimentation and Turbidity**

  Operation of any build alternative could result in sedimentation and turbidity impacts. The operation impacts of turbidity on fish and fish habitat would be similar to those described for construction of the build alternatives, except that these impacts may

become chronic. The habitats where increased sediment delivery exceeds the capacity of the affected water body to transport sediment are likely to experience changes in habitat suitability. Smaller streams are likely to be more sensitive to disturbance. These impacts are most likely to occur if ground disturbance takes place during periods of high runoff.

- **Degrade Water Quality**

  Operation and maintenance of any build alternative would require the use of potentially hazardous materials (e.g., paint and wood preservatives) and petroleum products (e.g., fuels, lubricants, and hydraulic fluids) that are toxic to fish and other aquatic organisms. As described for construction impacts, hazardous materials that enter a stream would affect the health and survival of fish.

  Coal dust impacts on surface waters were assessed in Chapter 6, *Coal Dust*. Coal dust that deposits to the ground during operation could make its way into surface waters, including fish-bearing streams. OEA found estimates of coal dust constituent concentrations in surface water to be below screening levels for ecological exposure, with the exception of the values for barium. The conservative assumptions in the analysis over-estimate the amount of barium in the water, and the chemical fate and transport properties of barium indicate that it would most likely precipitate out of water as insoluble barium sulfate.

8.4.4.2 Impacts by Build Alternative

The impacts on fish that are specific to each build alternative are summarized below and represented in the following table and figure.

- Table 8.4-6 shows the number of fish-bearing stream crossings and the miles of track within 985 feet of the fish-bearing stream for each build alternative.
- Figure 8.4-2 shows the fish-bearing stream crossings for each build alternative.

Table 8.4-6. Fish-Bearing River and Stream Crossings and Tracks near Fish-Bearing Rivers and Streams by Build Alternative

Build Alternative	Number of Fish-Bearing Streams Crossed[a]	Total Number of Fish-Bearing Stream Crossings	Track within 985 feet of the Tongue River (miles)	Track within 985 feet of Other Fish-Bearing Streams (miles)	Total Track within 985 feet of Fish-Bearing Streams (miles)
Tongue River	21	21	10.7	1.9	12.6
Tongue River East	19	20[b]	4.8	1.3	6.1
Colstrip	5	5	6.0	2.4	8.4
Colstrip East	3	4[b]	0.7	1.9	2.6
Tongue River Road	21	21	10.3	3.2	13.5
Tongue River Road East	17	18[b]	4.5	2.7	7.2
Moon Creek	17	18[b]	8.0	9.6	17.6
Moon Creek East	13	14[b,c]	2.1	9.0	11.1
Decker	9	9	1.7	0	1.7
Decker East	5	5	0.9	0	0.9

Notes:
[a] All build alternatives would cross the Tongue River, which is included in this number
[b] These crossing totals include a crossing of Otter Creek for a road relocation where a new bridge would be constructed
[c] Moon Creek would be crossed twice by the Moon Creek Alternatives

Tongue River Alternatives

Tongue River Alternative

Construction

The Tongue River Alternative would require construction of two bridge crossings over two perennial fish-bearing streams, the Tongue River and Otter Creek, and 19 intermittent streams that are likely to be seasonally fish-bearing (Table 8.4-6 and Figure 8.4-2). This build alternative would require 10.7 miles of tracks within 985 feet of the Tongue River and an additional 1.9 miles within 985 feet of other fish-bearing streams (Table 8.4-6). The fish-bearing water bodies and their associated fish communities would be subject to construction-related impacts (Section 8.4.4.1, *Impacts Common to All Build Alternatives, Construction*).

Operation

Operation and maintenance of the Tongue River Alternative would result in impacts associated with bridge crossings over the Tongue River and Otter Creek, including dewatering and fish relocation, sedimentation and turbidity, and possible spills of toxic substances (Section 8.4.4.1, *Impacts Common to All Build Alternatives*).

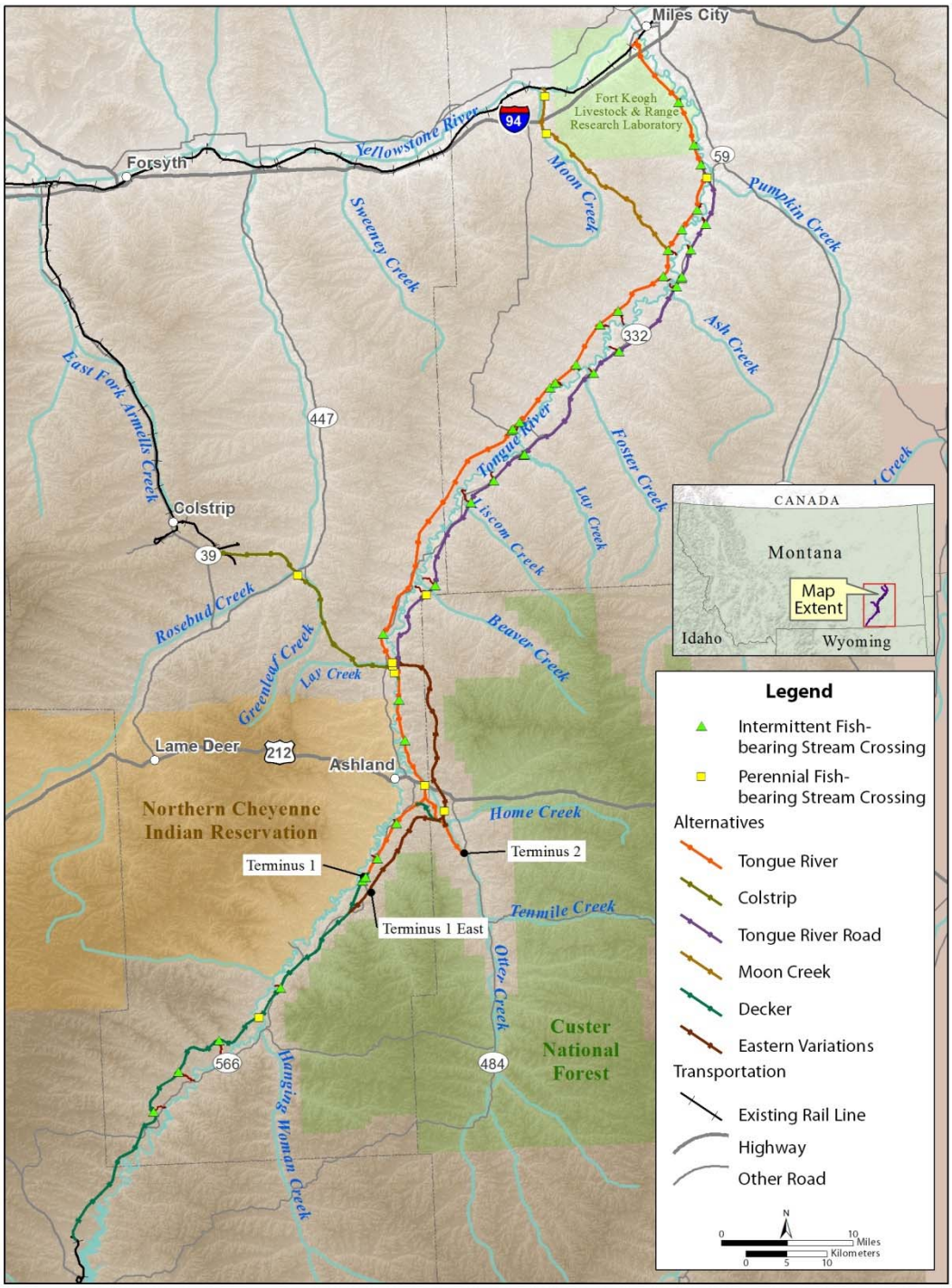

Figure 8.4-2. Fish-Bearing Stream Crossings in the Study Area

The Tongue River Alternative would operate on 12.6 miles of tracks within 985 feet of the Tongue River and other fish-bearing streams (Table 8.4-6), with impacts as described in Section 8.4.4.1, *Impacts Common to All Build Alternatives, Operation*).

Tongue River East Alternative

Construction

The Tongue River Alternative would require construction of two bridge crossings over two perennial fish-bearing streams, the Tongue River and Otter Creek, and 17 intermittent streams that are likely to be seasonally fish-bearing (Table 8.4-6 and Figure 8.4-2). This build alternative would require one additional bridge crossing of Otter Creek because of a road relocation. This build alternative would require 4.8 miles of tracks within 985 feet of the Tongue River and an additional 1.3 miles within 985 feet of other fish-bearing streams (Table 8.4-6).

Operation

Operation and maintenance of the Tongue River East Alternative would result in impacts similar to those described for the Tongue River Alternative, except that this build alternative would operate on 6.1 miles of tracks within 985 feet of the Tongue River and other fish-bearing streams (Table 8.4-6).

Colstrip Alternatives

Colstrip Alternative

Construction

The Colstrip Alternative would require construction of three bridge crossings over three perennial fish-bearing streams, the Tongue River, Rosebud Creek, and Otter Creek, and two intermittent streams that are likely to be seasonally fish-bearing (Table 8.4-6 and Figure 8.4-2). This build alternative would require 6.0 miles of tracks within 985 feet of the Tongue River and an additional 2.4 miles within 985 feet of other fish-bearing streams (Table 8.4-6). The fish-bearing water bodies and their associated fish communities would be subject to construction-related impacts (Section 8.4.4.1, *Impacts Common to All Build Alternatives, Construction*).

Operation

Operation and maintenance of the Colstrip Alternative would result in impacts associated with bridge crossings over the Tongue River, Rosebud Creek, and Otter Creek. The bridge crossing over the Tongue River is described in Section 8.4.4.1, *Impacts Common to All Build Alternatives.* The bridge crossing over Otter Creek would be as described for the Tongue River Alternative.

The Colstrip Alternative would operate on 8.4 miles of tracks within 985 feet of the Tongue River and other fish-bearing streams (Table 8.4-6), with impacts as described in Section 8.4.4.1, *Impacts Common to All Build Alternatives, Operation*).

Colstrip East Alternative

Construction

Construction of the Colstrip East Alternative would result in the same types and quantities of impacts on fish species as described for the Colstrip Alternative, except that it would require one additional bridge crossing on Otter Creek because of a road relocation and no crossings of intermittent fish-bearing streams. This build alternative would require 0.7 mile of tracks within 985 feet of the Tongue River and an additional 1.9 miles within 985 feet of other fish-bearing streams (Table 8.4-6).

Operation

Operation and maintenance of the Colstrip East Alternative would result in impacts similar to those described for the Colstrip Alternative, except that this build alternative would require 2.6 miles of tracks within 985 feet of the Tongue River and other fish-bearing streams (Table 8.4-6).

Tongue River Road Alternatives

Tongue River Road Alternative

Construction

The Tongue River Road Alternative would require construction of five bridge crossings over five perennial fish-bearing streams, the Tongue River, Otter Creek, Beaver Creek, Foster Creek, and Ash Creek, and 16 culvert crossings over intermittent streams that are likely to be seasonally fish-bearing. This build alternative would require 10.3 miles of tracks within 985 feet of the Tongue River and an additional 3.2 miles within 985 feet of other fish-bearing streams (Table 8.4-6). The fish-bearing water bodies and their associated fish communities would be subject to construction-related impacts (Section 8.4.4.1, *Impacts Common to All Build Alternatives, Construction*).

Operation

Operation and maintenance of the Tongue River Road Alternative would result in impacts associated with bridge crossings over the Tongue River, Otter Creek, Beaver Creek, Foster Creek, and Ash Creek. Operational impacts related to bridge crossings over the Tongue River and Otter Creek would be the same as those described for the Tongue River Alternative. The Beaver Creek, Ash Creek, and Foster Creek crossings would be located on

channel segments that have been modified by agricultural activities, road construction, and other activities that have already degraded aquatic habitat conditions.

The Tongue River Road Alternative would operate on 13.5 miles of tracks within 985 feet of the Tongue River and other fish-bearing streams (Table 8.4-6), with proximity impacts as described in Section 8.4.4.1, *Impacts Common to All Build Alternatives, Operation*.

Tongue River Road East Alternative

Construction

Construction of the Tongue River Road East Alternative would result in the same types and quantities of impacts on fish species as described for the Tongue River Road Alternative, except that it would require one additional bridge crossing of a fish-bearing stream, at Otter Creek, because of a road relocation. It would require four fewer culvert crossings over fish-bearing intermittent streams. This build alternative would require 4.5 miles of tracks within 985 feet of the Tongue River and an additional 2.7 miles within 985 feet of other fish-bearing streams (Table 8.4-6).

Operation

Operation and maintenance of the Tongue River Road East Alternative would result in impacts similar to those described for the Tongue River Road Alternative, except that this build alternative would operate on 7.2 miles of tracks within 985 feet of the Tongue River and other fish-bearing streams (Table 8.4-6).

Moon Creek Alternatives

Moon Creek Alternative

Construction

The Moon Creek Alternative would require construction of four bridge crossings over three fish-bearing streams, the Tongue River, Otter Creek, and Moon Creek, and 13 culvert crossings over intermittent streams that are likely to be seasonally fish-bearing. Moon Creek would be crossed twice (Table 8.4-6 and Figure 8.4-2). This build alternative would require 8.0 miles of tracks within 985 feet of the Tongue River, 7.7 miles of tracks within 985 feet of Moon Creek, and an additional 1.9 miles within 985 feet of other fish-bearing streams (Table 8.4-6). The fish-bearing water bodies and their associated fish communities would be subject to construction-related impacts (Section 8.4.4.1, *Impacts Common to All Build Alternatives, Construction*).

Operation

Operation and maintenance of the Moon Creek Alternative would result in impacts associated with bridge crossings over the Tongue River, Otter Creek, and Moon Creek.

Operational impacts related to bridge crossings over the Tongue River and Otter Creek would be the same as those discussed for the Tongue River Alternative. The bridge crossing over Moon Creek would incur similar impacts.

The Moon Creek Alternative would operate on 17.6 miles of tracks within 985 feet of the Tongue River, Moon Creek, and other fish-bearing streams (Table 8.4-6), with impacts as described in Section 8.4.4.1, *Impacts Common to All Build Alternatives, Operation*.

Moon Creek East Alternative

Construction

Construction of the Moon Creek East Alternative would result in the same types and quantities of impacts on fish species as those described for the Moon Creek Alternative, except that it would require one additional bridge crossing of a fish-bearing stream, at Otter Creek, because of a road relocation. It would require four fewer culvert crossings over fish-bearing intermittent streams. This build alternative would require 2.1 miles of track within 985 feet of the Tongue River, 7.7 miles of tracks within 985 feet of Moon Creek, and an additional 1.3 feet of track within 985 feet of other fish-bearing streams (Table 8.4-6).

Operation

Operation and maintenance of the Moon Creek East Alternative would result in impacts similar to those described for the Moon Creek Alternative, except that this build alternative would operate on 11.1 miles of tracks within 985 feet of the Tongue River, Moon Creek, and other fish-bearing streams (Table 8.4-6).

Decker Alternatives

Decker Alternative

Construction

The Decker Alternative would require construction of one bridge over one fish-bearing stream, the Tongue River, and eight culvert crossings over intermittent streams that are likely to be seasonally fish-bearing (Table 8.4-6 and Figure 8.4-2). This build alternative would require 1.7 miles of tracks within 985 feet of the Tongue River (Table 8.4-6). No other fish-bearing streams would occur within 985 feet of the Decker Alternative. The Tongue River and its associated fish community would be subject to construction-related impacts associated with the nature of the impact, such as those described above in Section 8.4.4.1, *Impacts Common to All Alternatives*, *Construction*. Construction of this build alternative would result in the following impact, in addition to the common impacts:

- **Increase Noise and Vibration**

  The length of the Tongue River bridge crossing and the angle at which the Decker Alternative would cross the Tongue River could require a bridge support to be placed in the Tongue River. Installation of this bridge support would most likely require pile driving in the Tongue River channel with use of an impact hammer or a combination of impact and vibratory hammers. Noise levels from vibratory pile driving are typically not as high as noise levels from impact pile driving, and this method is typically preferred where impacts on fish are of concern. However, piles that are installed with a vibratory hammer are typically "proofed" with an impact pile driver to provide load-bearing capacity (Washington State Department of Transportation 2013). Therefore, bridge construction often results in high-level noise impacts.

  Pile driving would expose nearby fish species to continuous and/or periodic noise levels that would be well in excess of ambient conditions. Vibration and noise exposure would most likely displace fish, trigger avoidance behavior, disrupt the ability to detect predators and prey, and, in some cases, cause direct injury or mortality (Hastings et al. 1996). The nature and extent of impacts would depend on the type of pile driving conducted, the noise levels produced, the proximity of individual fish to the noise source, and species and life-stage sensitivity to underwater noise exposure.

  Broadly speaking, fish species can be grouped into two categories with regard to sound sensitivity: hearing specialists, with specialized organs that increase both the range of noise detected and sensitivity to lower noise levels (Scholik and Yan 2001, 2002), and hearing generalists, which lack these specialized organs, have more limited hearing capability and rely less on hearing for survival (Scholik and Yan 2002). Hearing specialists such as fathead minnow, which are known to occur in the Tongue River, are susceptible to both short- and long-term impacts on hearing from noise sources (Scholik and Yan 2001, 2002). Similar impacts have been observed in other hearing specialists, including common carp and lake chub (Amoser and Ladich 2005, Popper et al. 2005), both of which have been observed in the study area. These species and other hearing specialists would be vulnerable to temporary and permanent hearing impacts from exposure to pile-driving noise.

  Juvenile and adult fish are capable of avoiding noise sources, thereby decreasing their exposure. Eggs, however, are stationary or move very slowly with the current. They could be exposed to extensive human-generated underwater noise if it occurs in the surrounding water column or substrate or if pile driving occurs when this life stage is present. Data are limited or inconclusive concerning the impacts of underwater noise, including pile-driving noise, on developing eggs (Banner and Hyat 1973, Hastings and Popper 2005, California Department of Transportation 2009). The few studies about the impacts on fish eggs, larvae, and juvenile fish are insufficient for reaching any conclusions with respect to the way underwater noise would affect survival (Hastings and Popper 2005).

Most of the fish species in the Tongue River typically spawn in spring or early summer. Depending on when bridge construction occurs, in-water construction activities in late summer/fall, when streamflow is relatively low and spawning and eggs are most likely to be absent, would reduce the potential for instream pile driving to affect spawning adults and fish eggs.

Elevated underwater noise levels generally travel in a line-of-sight path from the noise source. The Tongue River is highly *sinuous* at the location where the bridge crossing would occur, which would limit noise propagation (California Department of Transportation 2009). Water depth, substrate, and the presence of features such as islands and side channels would also limit noise propagation.

Operation

Operation and maintenance of the Decker Alternative would generally avoid small fish-bearing tributary streams and the Tongue River because the route is sited in upland areas. The bridge crossing over the Tongue River is described in Section 8.4.4.1, *Impacts Common to All Build Alternatives.* This build alternative would operate on 1.7 miles of tracks within 985 feet of the Tongue River (Table 8.4-6), with impacts as described in Section 8.4.4.1, *Impacts Common to All Build Alternatives, Operation*.

Decker East Alternative

Construction

Construction of the Decker East Alternative would result in the same types and quantities of impacts on fish species as described for the Decker Alternative, except that the northern end of the route is sited in upland areas, up to 1 mile farther away from the Tongue River floodplain. This build alternative would require four crossings of intermittent streams that are likely to be seasonally fish-bearing in comparison to the eight intermittent streams that would be crossed by the Decker Alternative. This greater distance from the Tongue River would reduce the potential for construction impacts on fish habitat in the Tongue River. This build alternative would require 0.9 mile of tracks within 985 feet of the Tongue River (Table 8.4-6).

Operation

Operation and maintenance of the Decker East Alternative would result in impacts similar to those described for the Decker Alternative, except that this build alternative would operate on 0.9 mile of tracks within 985 feet of the Tongue River streams (Table 8.4-6), with proximity impacts as described in Section 8.4.4.1, *Impacts Common to All Build Alternatives, Operation*.

No-Action Alternative

Under the No-Action Alternative, TRRC would not construct or operate the proposed Tongue River Railroad, and there would be no impacts on fish.

8.4.4.3 Mitigation and Unavoidable Environmental Consequences

To avoid or minimize the environmental impacts on fish from the proposed rail line, OEA is recommending that the Board impose eight mitigation measures, including one measure volunteered by TRRC (Chapter 19, Section 19.2.5, *Biological Resources*). These measures would require TRRC to gain approval for surface water withdrawals, meet cleanliness requirements for equipment used in open water or riparian corridors, restore and revegetate streambanks, comply with in-water work windows, attenuate noise when installing piling (noise mitigation applicable only to the Decker Alternatives), use a block-net to remove and exclude fish from in-water work areas, work with appropriate agencies to minimize incursions in floodplains and the channel migration zone, and design the Tongue River crossings to minimize impacts on aquatic habitats and provide adequate passage for fish beneath the bridge.

Even with the implementation of OEA's recommended mitigation measures and TRRC's voluntary measure, construction and operation of the proposed rail line would cause unavoidable impacts on fish. These impacts could include mortality, blocked fish movement, fish stranding and injury, sedimentation and turbidity, alteration of instream and riparian habitats, degradation of water quality, alteration of stream hydraulics, and noise and vibration impacts (noise and vibration impacts applicable only to the Decker Alternatives). However, common fish species addressed in this section are secure and not vulnerable to decline. OEA concludes that these adverse impacts would be minor.

8.5 Special-Status Species

This section describes the impacts on special-status species that would result from construction and operation of each of the build alternatives. The subsections that follow describe the special-status species study area, the methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives on special-status species. The regulations and guidance related to special-status species are summarized in Section 8.6, *Applicable Regulations*. All other terrestrial wildlife species are addressed in Section 8.3, *Wildlife*, and in Appendix J, *Wildlife Resources and Special-Status Species*. Other fish species in the study area are addressed in Section 8.4, *Fish*, and in Appendix K, *Fish Resources*. Other plant species are addressed in Section 8.2, *Vegetation.* Appendix L, *Biological Assessment*, provides the full impact assessment for federally listed threatened and endangered species that could be affected by the proposed rail line, as required under Section 7(a)(2) of the federal Endangered Species Act (ESA). The contribution of the proposed rail line to cumulative impacts on special-status species is discussed in Chapter 18, *Cumulative Impacts*.

Special-status species are species that meet one of the following criteria.

- Listed as endangered or threatened under the ESA.
- Candidate species for ESA listing.
- Sensitive species listed by the Bureau of Land Management (BLM) Miles City Field Office.
- Montana State Species of Concern (administered by Montana Fish, Wildlife & Parks [Montana FWP])

In summary, 47 special-status wildlife species use habitats in the study area. The Tongue River Road Alternatives and Moon Creek Alternatives would affect the most acres of special-status wildlife habitat. The Tongue River Road Alternatives would affect the most special-status wildlife species and taxa, followed by the Moon Creek Alternatives and Tongue River Alternatives. The Decker Alternatives would affect the fewest acres of special-status wildlife habitat. The Colstrip Alternatives would affect the fewest special-status wildlife species and taxa. Overall, the Colstrip Alternatives would have the fewest impacts on habitat and special-status wildlife species.

Five special-status fish species are known or likely to occur in the study area. The impacts on these species would vary, based on the proximity of each build alternative to habitats known or likely to be used by each species. All five special-status fish species occur in the Tongue River below the Tongue and Yellowstone Diversion Dam (river mile 20), and two of the five species occurs further up the Tongue River above the dam. One of the five fish species is also known or likely to occur in Rosebud Creek. Based on this distribution, the

build alternatives that would cross or run parallel to the Tongue River downstream of Otter Creek would have the greatest impacts on special-status fish and their habitats. Any build alternative would cross one fish-bearing stream with special-status fish (Tongue River). The Colstrip Alternatives would cross an additional fish-bearing stream with special-status fish (Rosebud Creek). The Tongue River Road Alternatives have the greatest potential to affect special-status fish because of the location of the Tongue River crossing and the potential occurrence of these species below the Tongue and Yellowstone Diversion Dam.

No plant species are ESA-listed in Custer, Rosebud, Powder River, or Big Horn Counties. Ten state special-status plant species occur or could occur in the study area. One of these species was documented by the Montana Natural Heritage Program (MNHP) in the rights-of-way for the Moon Creek Alternatives. Another was documented by MNHP in the rights-of-way for the Decker Alternatives. Any build alternative would affect suitable habitat for special-status plants species in the rights-of-way. BLM does not list any special-status plants for the area under the jurisdiction of the Miles City Field Office (BLM 2014), which includes the study area.

OEA concludes that construction and operation of the proposed rail line would affect special-status plant, fish, and wildlife species. These adverse impacts would be minor.

8.5.1 Study Area

OEA defined four study areas for special-status wildlife species, consistent with the study areas for wildlife described in Section 8.3.1, *Study Area*. The largest study area is the 4-miles study area (881,732 acres), and all other special-status wildlife study areas are contained within this study area.

OEA defined the study area for special-status fish as the area within 2 miles of the centerline of the right-of-way, consistent with the study area described in Section 8.4.1, *Study Area.*

OEA derived the study area for special-status plants from the BLM Miles City Field Office's protocol for establishing special-status plant species lists for projects (Bureau of Land Management n.d.). While this protocol is specific to BLM lands or actions, no other agency guidance provides parameters for establishing a list of special-status plants on private lands. OEA followed the two-step BLM protocol, as follows.

- **Step 1.** OEA reviewed the MNHP Plant Species of Concern Report (2014) for each subwatershed (Hydrologic Unit Code 6) in the study area for known occurrences of special-status plants. The subwatershed approach is preferred (rather than by county or other geographic area) because if a special-status plant is identified in a particular watershed, it could occur elsewhere in the same watershed under similar conditions (Schroeder pers. comm.). OEA included any special-status plant if MNHP identified the plant in a watershed that would be crossed by a build alternative.
- **Step 2.** OEA reviewed the MNHP Predicted Suitable Habitat Models (if available) to determine if suitable habitat for any special-status plant species is found in the study area.

Suitable habitats in the models are ranked as low, moderate, or high. OEA included special-status plants if highly ranked habitat would be within 5 miles, moderately ranked habitat would be within 3 miles, or if low-ranked habitat would be within a right-of-way.

8.5.2 Analysis Methods

OEA used the analysis methods described in Section 8.3, *Wildlife,* and Section 8.4, *Fish* for determining impacts on special-status wildlife and fish species. OEA used the analysis methods described in Section 8.2, *Vegetation*, for determining impacts on special-status plants except that OEA used three additional geographic information system (GIS) data layers.

- MNHP natural heritage data that identify known current and historical locations of special-status plant species.
- MNHP Predicted Suitable Habitat Models that identify potential habitat areas for special-status plants.
- Wetland field survey data (Appendix M, *Wetland Resources and Assessments*).

OEA overlaid these GIS data layers with the rights-of-way GIS data layer to determine impacts on special-status plants or suitable habitats. The analysis distinguishes between impacts on special-status plant within the rail right-of-way and impacts beyond the right-of-way but within the study area.

8.5.2.1 Surveys

OEA reviewed special-status species lists prior to commencing field surveys, and watched for all special-status species and habitats while conducting baseline surveys for all wildlife species. OEA also conducted the following baseline surveys between January and September 2013.

- Raptor nests within the 2-mile survey area; winter bald eagle roosts within the 1-mile survey area.
- Winter greater sage-grouse concentration areas and *leks*[1] within the 2-mile survey area; known leks out to 4 miles.
- Prairie dog colonies within the 1-mile survey area; colonies mapped within 0.5 mile.
- *Diurnal* breeding bird point counts and bats within the 1-mile survey area.
- Nocturnal breeding birds, amphibians, and reptiles within the 0.5-mile survey area.

OEA based all survey areas on established agency protocols and modified them with the assistance of federal and state entities to provide the best information on local populations in a specific area while accounting for wildlife movement and home ranges.

[1] Terms italicized at first use are defined in Chapter 25, *Glossary.*

OEA conducted physical habitat surveys and fish surveys in fish-bearing streams in the study area as described in Section 8.4, *Fish*.

8.5.3 Affected Environment

The existing environmental conditions related to special-status species are presented in the following sections.

- Plants: Section 8.2.3, *Affected Environment*
- Wildlife: Section 8.3.3, *Affected Environment*
- Fish: Section 8.4.3, *Affected Environment*

All special-status plant, wildlife, and fish species that could occur in the study area are listed in Table 8.5-1.

Table 8.5-1. Special-Status Plant, Wildlife, and Fish Species That Could Occur in the Study Area

Common Name	Scientific Name	Associated Habitat[a]	Historical Occurrence[b]	Documented Occurrence[c]	Montana State Status[d]	BLM-MCFO[e]	USFWS[f]
MAMMALS							
Furbearers							
Swift fox	*Vulpes velox*	Prairies/arid plains	x	x	S3	Sensitive	–
Nongame Mammal: Medium Mammals—1-mile wildlife survey area							
Black-footed ferret	*Mustela nigripes*	Grassland/steppe/shrub steppe (associated with prairie dogs)	x	–	S1	Special Status	LE
Nongame Mammal: Small Mammals—1-mile wildlife survey area							
Black-tailed prairie dog	*Cynomys ludovicianus*	Grassland/shrubland	x	x	S3	Sensitive	–
Fringed myotis	*Myotis thysanodes*	Desert shrubland/sagebrush-grassland/woodland	–	x	S3	Sensitive	–
Hoary bat	*Lasiurus cinereus*	Forest	x	x	S3	–	–
Townsend's big-eared bat	*Corynorhinus townsendii*	Caves/forests	x	x	S2	Sensitive	–
BIRDS							
Raptors—2-mile wildlife survey area							
Bald eagle	*Haliaeetus leucocephalus*	Riparian/lakes reservoirs	x	x	S4	Sensitive	BCC
Burrowing owl	*Athene cunicularia*	Grassland/prairie dog colonies	x	x	S3B	Sensitive	BCC
Ferruginous hawk	*Buteo regalis*	Grassland/sagebrush	x	x	S3B	Sensitive	BCC
Golden eagle	*Aquila chrysaetos*	Prairies/cliffs/open woodlands	x	x	S3	Sensitive	BCC
Peregrine falcon	*Falco peregrinus*	Cliffs	x	–	S3	Sensitive	BCC
Upland Game Birds—1-mile wildlife survey area							
Greater-sage grouse	*Centrocercus urophasianus*	Sagebrush	x	x	S2	Sensitive	C
Nongame Birds—1-mile wildlife survey area							
Cuckoos							
Black-billed cuckoo	*Coccyzus erythropthalmus*	Woodlands/riparian	x	x	S3B	–	BCC
Yellow-billed cuckoo	*Coccyzus americanus*	Woodlands/riparian	x	x	S3B	–	–

Common Name	Scientific Name	Associated Habitat[a]	Historical Occurrence[b]	Documented Occurrence[c]	Montana State Status[d]	BLM-MCFO[e]	USFWS[f]
Finches							
Cassin's finch	*Haemorhous cassinii*	Forests	x	x	S3	–	–
Gulls and Terns							
Franklin's gull	*Leucophaeus pipixcan*	Prairie marshes/water features	–	x	S3B	Sensitive	–
Interior least tern[g]	*Sterna antillarum athalassos*	Large prairie rivers	–	–	S1B	Special Status	LE
Icterids							
Bobolink	*Dolichonyx oryzivorus*	Grassland	x	x	S3B	–	–
Jays, Crows, and their Allies							
Pinyon jay	*Gymnorhinus cyanocephalus*	low elevation ponderosa pine, limber pine, juniper woodlands	x	x	S3	–	BCC
Loons and Grebes							
Clark's grebe	*Aechmophorus clarkia*	Lakes/reservoirs	x	–	S3B	–	–
Common loon	*Gavia immer*	Lakes/reservoirs	–	x	S3B	–	–
Mimids							
Sage thrasher	*Oreoscoptes montanus*	Sagebrush	x	x	S3B	Sensitive	BCC
Pelicans and Cormorants							
American white pelican	*Pelecanus erythrorhynchos*	Wetlands/water features	x	x	S3B	–	–
Pipets, Waxwings, and Starlings							
Sprague's pipit	*Anthus spragueii*	Grassland	x	–	S3B	Sensitive	C, BCC
Rails and Cranes							
Whooping crane[g]	*Grus americana*	Wetlands	–	–	S1M	Special Status	LE
Shorebirds							
Long-billed curlew	*Numenius americanus*	Grasslands/moist meadows	x	x	S3B	Sensitive	BCC
Mountain plover	*Charadrius montanus*	Prairie dog colonies/grassland	x	–	S2B	Sensitive	BCC
Shrikes and Vireos							
Loggerhead Shrike	*Lanius ludovicianus*	Shrubland/sagebrush	x	x	S3B	Sensitive	BCC

Common Name	Scientific Name	Associated Habitat[a]	Historical Occurrence[b]	Documented Occurrence[c]	Montana State Status[d]	BLM-MCFO[e]	USFWS[f]
Sparrows and their Allies							
Baird's sparrow	*Ammodramus bairdii*	Prairie	x	x	S3B	Sensitive	BCC
Brewer's sparrow	*Spizella breweri*	Sagebrush	x	x	S3B	Sensitive	BCC
Chestnut-collared longspur	*Calcarius ornatus*	Grassland	x	x	S2B	Sensitive	BCC
Green-tailed towhee	*Pipilo chlorurus*	shrubland/shrub-steppe/open areas in montane forest	x	–	S3B	–	–
Sagebrush sparrow	*Artemesiospiza nevadensis*	Sagebrush/sagebrush-saltbrush	–	x	S3B	–	BCC
Tanagers and their Allies							
Evening grosbeak	*Coccothraustes vespertinus*	Mixed conifer forests	x	–	S3	–	–
Veery	*Catharus fuscescens*	Deciduous forests/riparian	x	–	S3B	Sensitive	–
Tyrant Flycatchers							
Alder flycatcher	*Empidonax alnorum*	Riparian shrub/forests	x	–	S3B	–	–
Wading Birds							
American bittern	*Botaurus lentiginosus*	Wetlands	–	x	S3B	Sensitive	BCC
Great blue heron	*Ardea Herodias*	Wetlands/water features	x	x	S3	–	–
Woodpeckers							
Lewis's woodpecker	*Melanerpes lewis*	Open forests/river bottom woods/edge habitats/forest burns	x	x	S2B	–	BCC
Red-headed woodpecker	*Melanerpes erythrocephalus*	Riparian/forest burns/savannahs	x	x	S3B	Sensitive	BCC
REPTILES and AMPHIBIANS							
Reptiles—0.5-mile wildlife survey area							
Greater short-horned lizard	*Phrynosoma hernandesi*	Arid environments/short-grass prairie/sagebrush	–	x	S3	Sensitive	–
Milksnake	*Lampropeltis triangulum*	Sagebrush/grassland/ponderosa pine	x	–	S2	Sensitive	–
Snapping turtle	*Chelydra serpentine*	Water features	x	–	S3	Sensitive	–
Spiny softshell	*Apalone spinifera*	Water features	x	–	S3	Sensitive	–
Western hog-nosed snake	*Heterodon nasicus*	Grassland/sagebrush	x	–	S2	Sensitive	–

Common Name	Scientific Name	Associated Habitat[a]	Historical Occurrence[b]	Documented Occurrence[c]	Montana State Status[d]	BLM-MCFO[e]	USFWS[f]
Amphibians—0.5-mile wildlife survey area							
Great plains toad	*Anaxyrus cognatus*	Sagebrush/grassland/water features/agriculture	x	x	S2	Sensitive	–
Plains spadefoot	*Spea bombifrons*	Water features with sandy soil	x	x	S3	Sensitive	–
FISH							
Pallid sturgeon	*Scaphirhynchus albus*	Warm free-flowing rivers	x	x	S1	Special Status	LE
Paddlefish	*Polyodon spathula*	Slow waters of large rivers	x	x	S2	Sensitive	–
Sturgeon chub	*Macrhybopsis gelida*	Turbid waters with moderate to strong currents	x	x	S2/S3	Sensitive	–
Sauger	*Sander Canadensis*	Larger turbid rivers	x	x	S2	Sensitive	–
Blue sucker	*Cycleptus elongates*	Clear, swift waters	x	x	S2/S3	–	–
PLANTS[h]							
Bractless blazingstar	*Mentzelia nuda*	Open areas, sandy or gravelly soils	x	–	S1/S2	–	–
Large-flowered beardtongue	*Penstemon grandiflorus*	Sandy soils	–	–	S1	–	–
Schweinitz' flatsedge	*Cyperus schweinitzii*	Sandy sites	–	–	S2	–	–
Slender-branched popcorn-flower	*Plagiobothrys leptocladus*	Wetland/riparian (low elevation)	–	–	S2/S3	–	–
Narrowleaf milkweed	*Asclepias stenophylla*	Sandy sites	–	–	S2	–	–
Barr's milkvetch	*Astragalus barrii*	Sparsley vegetated knobs and buttes	–	–	S3	–	–
Heavy sedge	*Carex gravida*	Wetland/riparian - wooded draws and ravines	–	–	S3	–	–
Woolly twinpod	*Physaria didymocarpa var. lanata*	Grassland/shrublands (open/plains)	–	–	S2/S3	–	–
Nuttall desert-parsley	*Lomatium nuttallii*	Rocky, pine woodlands	x	–	S2	–	–
Double bladderpod	*Physaria brassicoides*	Breaklands/badlands	–	–	S3	–	–

Common Name	Scientific Name	Associated Habitat[a]	Historical Occurrence[b]	Documented Occurrence[c]	Montana State Status[d]	BLM-MCFO[e]	USFWS[f]

Notes:

[a] Plant habitat descriptions from MNHP *Plant Species of Concern Report* (Montana Natural Heritage Program 2014). Fish and wildlife habitat descriptions obtained from *Montana Field Guide* (Montana Natural Heritage Program and Montana Fish, Wildlife & Parks n.d.-e).

[b] Historical occurrence obtained from Montana Natural Heritage Program 2013a, 2013b; Roundstone 2013

[c] Species documented by OEA during 2013 baseline surveys

[d] No state agency has jurisdiction over special-status plants on private lands and they do not manage for them. Montana FWP has jurisdiction over fish and wildlife.

- S1 = at high risk because of extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.
- S2 = At risk because of limited and/or potentially declining population numbers, range and or/habitat, making it vulnerable to global extinction or extirpation in the state.
- S3 = potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.
- B = breeding; refers to the breeding population of the species in Montana.
- M = migratory; species occurs in Montana only during migration (Montana Natural Heritage Program and Montana Fish, Wildlife & Parks n.d.-e).

[e] Species designated by the BLM State Director in need of special considerations in management attention due to population or habitat concern and are found within the Miles City Field Office region (Bureau of Land Management 2013, 2014). The BLM designation for federally listed threatened or endangered species is special-status species.

[f] Fish and wildlife species listed or in the listing process under the ESA. No plant species are listed under the ESA in Custer, Rosebud, Powder River, or Big Horn Counties.

- LE = listed endangered
- C = candidate
- BCC = species listed on the Birds of Conservation Concern list maintained by USFWS

[g] There are no known historical or documented occurrences of interior least tern or whooping crane in the study area; however, these species may migrate through the study area and are listed by USFWS as potentially occurring in Custer County (both species) and Rosebud County (interior least tern) for Section 7 ESA purposes.

[h] All special-status plant species have either been documented by MNHP or have predicted suitable habitat present in the study area.

BLM = Bureau of Land Management; MCFO = Miles City Field Office; USFWS = U.S. Fish and Wildlife Service; MNHP = Montana Natural Heritage Program; Montana FWP = Montana Fish, Wildlife & Parks; ESA = Endangered Species Act

8.5.3.1 Federally Listed, Proposed, and Candidate Species

Section 7(a)(2) of the ESA requires federal agencies to ensure that any action the agencies authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed threatened or endangered species or result in the destruction or adverse modification of designated *critical habitat*. If a federal agency determines its action may affect a threatened or endangered species, or critical habitat, the agency must initiate consultation with the U.S. Fish and Wildlife Service (USFWS) (for terrestrial and freshwater species) to ensure that the species or its critical habitat is not jeopardized. The National Marine Fisheries Service (NMFS) also implements the ESA, and has jurisdiction over marine and anadromous listed species. For some coastal species, USFWS and NMFS have joint jurisdiction. There are no species under NMFS jurisdiction in the study area. Section 7(a)(2) requires a federal agency to prepare a biological assessment for *major construction activities*, as defined in 50 Code of Federal Regulations [C.F.R.] § 402.02. The outcome of the biological assessment determines whether formal or informal consultation is necessary. If formal consultation is necessary, USFWS will issue a biological opinion, which will state whether the federal action would jeopardize the continued existence of federally listed species or result in destruction or adverse modification of designated critical habitat. See Appendix L, *Biological Assessment*, for detailed analysis of the proposed rail line's impacts on federally listed threatened, endangered, candidate, and proposed species.

OEA consulted USFWS to establish the list of threatened and endangered wildlife species that could be affected by the proposed rail line. Four endangered and two candidate species may occur in one or more counties of the study areas (Table 8.5-2). Of these species, only the whooping crane has designated critical habitat; however, this critical habitat is not mapped in or near the study area (U.S. Fish and Wildlife Service 2012). The red knot is a bird that is currently proposed for listing as a threatened species by USFWS (78 *Federal Register* (Fed. Reg.) 60023); the geographic range of this proposal includes Rosebud County. However, there are no red knots or red knot habitat present in the study area (see Appendix L, *Biological Assessment*, for more information and dismissal of this species from further analysis). The northern long-eared bat is currently proposed for listing as an endangered species in the study area by USFWS (78 *Federal Register* (Fed. Reg.) 61046). Based on the most recent USFWS species range map (U.S. Fish and Wildlife Service 2015) and several bat survey efforts conducted in the study area over multiple years, OEA determined that the species would not be found in the study area (see Appendix L, *Biological Assessment*, for more information and dismissal of this species from further analysis).

Table 8.5-2. Status of Federally Listed and Candidate Wildlife Species in the Study Area

Species	Status by County			
	Big Horn	**Custer**	**Powder River**	**Rosebud**
Pallid sturgeon (*Scaphirhynchus albus*)	–	Endangered	–	Endangered
Black-footed ferret (*Mustela nigripes*)	Endangered	Endangered	Endangered	Endangered
Interior least tern (*Sterna antillarum athalassos*)	–	Endangered	–	Endangered
Whooping crane (*Grus americana*)	–	Endangered	–	–
Greater sage-grouse (*Centrocercus urophasianus*)	Candidate	Candidate	Candidate	Candidate
Sprague's pipit (*Anthis spragueii*)	Candidate	Candidate	Candidate	Candidate

Pallid Sturgeon

The pallid sturgeon (*Scaphirhynchus albus*) was listed as endangered under the ESA on September 6, 1990 (55 Fed. Reg. 36641). Pallid sturgeon prefer large, swift, turbid, and relatively warm free-flowing rivers (Wildhaber et al. 2005). These substrate-oriented fish are specifically adapted to high-turbidity, large rivers. In Montana, the pallid sturgeon inhabits water with temperatures ranging from 32 to 86 degrees Fahrenheit (°F). During the summer, pallid sturgeon typically occupy water depths ranging from 4 to 12 feet, but they move to deeper water during winter. The pallid sturgeon prefer sand substrate, but are also known to use gravel and rock substrate.

In the northern portions of the species' range, adult pallid sturgeon are typically found in main-channel reaches with islands and sinuous channels (U.S. Fish and Wildlife Service 2014), while subadult hatchery-reared pallid sturgeon tend to be less selective of main-channel habitats (Gerrity 2005 as cited in U.S. Fish and Wildlife Service 2014). The following factors are potential threats to the habitat or range of pallid sturgeon (U.S. Fish and Wildlife Service 2014).

- Large river habitat alterations: river channelization, impoundment, and altered flow regimes affect habitat.
- Water quality: alterations to water temperature and dissolved oxygen concentrations, and discharge of contaminants and pollution in water can cause adverse health problems and impair reproduction.
- Entrainment: diversion of stream water for other uses (e.g., irrigation, power plants) creates the opportunity for pallid sturgeon to follow the flow, which can result in stranding and mortality.
- Climate change: could reduce stream flows and increase water temperatures, leading to altered spawning behavior, reduced survival of early life stages, and reduced late-season habitat suitability.

Wild pallid sturgeon were historically documented in the lower reaches of some of the larger tributaries to the Missouri and Yellowstone Rivers, including the Tongue River (U.S. Fish and Wildlife Service 2014). The historic distribution in the Yellowstone River extended upstream to the confluence with the Bighorn River (110 miles upstream of Miles City). The accuracy of this historic distribution is unknown because the pallid sturgeon was not recognized as a species until 1905, resulting in very little data concerning earlier distribution or abundance levels. Even into the mid-1900s, the species was commonly included in the commercial catch records as either shovelnose or lake sturgeon (Keenlyne 1995 as cited in U.S. Fish and Wildlife Service 2014).

Pallid sturgeon have not been observed in the Tongue River in recent times and are not expected to occur in the Tongue River. Since being listed in 1990, wild pallid sturgeon have been documented in the Missouri River between Fort Peck Reservoir and Fort Benton and downstream of Fort Peck Dam. Wild pallid sturgeon occur in the Yellowstone River downstream of the Intake Diversion Dam (approximately 100 miles downstream of Miles City). The Intake Diversion Dam completely blocks pallid sturgeon migrating up the Yellowstone River. However, in June 2011, five adults were radio-tracked migrating around and above the dam through a historic side channel (Backes pers. comm.). Previously, pallid sturgeon had not been sampled in the historic side channel, but the tracking study confirmed that, under high flow conditions, pallid sturgeon can migrate around and above the dam through this channel. Three of the pallid sturgeon (one female and two males) migrated up the Yellowstone River to the confluence with the Powder River (78 river miles upstream of Intake Diversion Dam). The males migrated to river mile 5 of the Powder River while the female migrated to river mile 20. The female deposited eggs in the Powder River or in the Yellowstone River near the Powder River confluence. This documentation is relevant to the Tongue River considering the Powder River is only 35 river miles downstream from the confluence of the Powder River. As such, successful passage of adult pallid sturgeon in the side channel should be considered a rare event. The Intake Diversion Dam is believed to be a key limiting factor in the recovery of the species (U.S. Fish and Wildlife Service 2014). Planning efforts by the U.S. Fish and Wildlife Service, Bureau of Reclamation, and U.S. Army Corps of Engineers will ultimately provide fish passage at the Intake Diversion Dam, increasing the potential for pallid sturgeon to occur naturally in the Yellowstone River upstream of the Intake Diversion Dam.

Juvenile pallid sturgeon are raised at the Miles City Fish Hatchery as part of ongoing conservation efforts, and are released in the Yellowstone River upstream of the Intake Diversion Dam (U.S. Fish and Wildlife Service 2014). This hatchery is one of only two state-run hatcheries that rear pallid sturgeon, and can produce about 3,000 juvenile sturgeon annually (U.S. Fish and Wildlife Service 2009). The hatchery also produces about 35 million walleye fry and fingerlings, 350,000 northern pike fingerlings, 325,000 largemouth and smallmouth bass fingerlings, and 10,000 tiger musky fingerlings annually, and maintains adult and juvenile largemouth and smallmouth bass as broodstock. The hatchery pumps water from the Yellowstone River to an on-site reservoir, which supplies water to the

hatchery building, 45 earthen rearing ponds covering about 52 acres, and eight concrete raceways (Montana Fish Wildlife & Parks 1997).

Black-Footed Ferret

The black-footed ferret (*Mustela nigripes*) was listed as endangered under the ESA on March 11, 1967 (32 Fed. Reg. 4001). The black-footed ferret is the only ferret species native to North America, with a distribution and persistence intricately linked to the distribution and presence of prairie dog (*Cynomys* spp.) colonies. The black-footed ferret preys almost exclusively on prairie dogs and relies on their colonies for shelter, hunting sites, and *parturition* sites (where the female gives birth). Historically, the black-footed ferret range included much of the western Great Plains, extending north into Canada and as far south as Texas and Arizona. In southeastern Montana, the black-footed ferret coincides with black-tailed prairie dog colonies, which are commonly found in semi-desert and short-grass to midlevel-grass prairies (Esch et al. 2005). USFWS has established that a minimum of 80 acres of black-tailed prairie dog colony or two or more neighboring prairie dog colonies with a sum of at least 80 acres and less than 7 kilometers (4.34 miles) from each other is required to support black-footed ferrets (U.S. Fish and Wildlife Service 1989).

No ferret population exists in the study area or in the region, and only two recorded observations from 1923 exist in the study area (Montana Natural Heritage Program 2013a, 2013b). The ferret was reintroduced on the Northern Cheyenne Reservation between 2008 and 2010. Eighty-eight ferrets were released over the 3-year period; however, by 2011, only one ferret was detected (U.S. Fish and Wildlife Service 2012). Reintroduction efforts took place on a 2,000-acre black-tailed prairie dog complex located 5 miles south of Ashland and just west of Birney Road (Montana Natural Heritage Program 2013a, Montana Prairie Dog Working Group 2002). This area overlaps the 1-mile study area; however, ferret reintroductions failed in this area. Prairie dog colonies in the region have seen declines since 2009, due to an ongoing outbreak of sylvatic plague, a bacterial disease that is lethal to prairie dogs (Farmer 2012, FaunaWest Wildlife Consultants 2012). In 2005, nocturnal spotlight surveys and diurnal searches were conducted at an active prairie dog colony on Fort Keogh in the study area; no ferrets or their sign were detected during diurnal searches of the colony (Thunderbird Wildlife Consulting 2005). OEA remapped this area in 2013 as part of the baseline surveys. The 168-acre colony surveyed in 2005 has since divided into two smaller colonies of 10.2 acres and 114.6 acres.

Ferret habitat in the study area is limited to three active prairie dog colonies larger than the 80-acre stipulation. A few other areas contain colonies less than 7 kilometers apart; however, most colonies that OEA documented were small (average colony size in the study area was 29.3 acres) and separated by great distances. No black-footed ferrets or sign thereof were recorded in any prairie dog colonies in the study area during the 2013 baseline surveys.

Greater Sage-Grouse

The greater sage-grouse (*Centrocercus urophasianus*) was listed as a candidate species on March 23, 2010 (75 Fed. Reg. 13910). Greater sage-grouse range is present throughout sagebrush habitats in the western United States and southern Canada. Once a common sight in 12 western states and three Canadian provinces, the sage-grouse has suffered population declines throughout its range and is now extinct in five states and one Canadian province. Population declines are, in large part, due to habitat loss and alteration from natural causes (e.g., fire, drought) and human causes (Connelly and Braun 1997, Connelly et al. 2004).

Greater sage-grouse are physically the largest grouse species in North America and rely on a variety of habitats in sagebrush-dominated landscapes to reproduce and survive. Sage-grouse are one of the many birds that use a lek mating system, in which males congregate at specific locations to compete for mates. These locations are open areas in relatively flat terrain surrounded by sagebrush stands (Connelly et al. 2004, Montana Sage-Grouse Work Group 2005). Nesting habitats are in moderately dense sagebrush stands with suitable nonwoody vegetation understory (Aldridge 2005, Connelly et al. 2004). In Montana, more than half of nesting sites are within 2 miles of a lek (Montana Sage-Grouse Work Group 2005). Brood-rearing habitat consists of areas with high abundance and diversity of flowering plants. The species also needs moist areas or water that persists through the summer to support wildflower species (Aldridge and Boyce 2007, Aldridge 2005, Bureau of Land Management 2009, Connelly et al. 2004). Winter habitat consists of areas of dense sagebrush with an average height of 10 inches in gentle topography. Sagebrush height is important for adequate cover. In increasing snow depths, sage-grouse require taller, more mature stands of sagebrush (Bureau of Land Management 2009, Connelly et al. 2004, Doherty et al. 2008, Montana Sage-Grouse Work Group 2005). The wildlife study area is in Montana FWP Region 7, where more than 11 million acres are classified as sage-grouse habitat or 42 percent of the state-wide total; however, only 4.7 million acres are regularly monitored (Montana Sage-Grouse Work Group 2005).

Sage-grouse populations are currently stable in Montana (Bureau of Land Management 2013). Sage-grouse populations are strongly cyclic, meaning they experience alternating periods of population increases and decreases (Connelly and Braun 1997, Connelly et al. 2004, Fedy and Aldridge 2011). Statewide populations have been monitored continually since the early 1960s. Since monitoring began, sage-grouse populations at the state level increased, reaching an all-time high in 1984. Sharp declines were documented from 1991 to 1996; however, populations were again increasing through the early 2000s (Montana Sage-Grouse Work Group 2005). Region 7 currently has 353 active leks, of which 80 are monitored on an annual basis, and the 25-year average is 22 males per lek (Bureau of Land Management 2013, Montana Sage-Grouse Work Group 2005). Populations in Region 7 peaked in 2006, with 988 males observed, then declined through 2009, and increased in 2010. Grouse populations in 2013 were approximately 50 percent lower than the long-term average. The population appears to be declining at a rate similar to declines seen in the 1990s (Montana Fish Wildlife & Parks 2013).

The majority of the study area hosts habitats that are inadequate for supporting greater sage-grouse. The available sagebrush-grasslands provide marginal breeding and brood-rearing habitat and these areas are surrounded by trees and steep terrain that provide greater potential for predation. Marginal habitat is present in the northern-most part of the study area, just south of Miles City, and at the extreme southern end, near Decker. Also, no large, dense, contiguous sagebrush stands exist in the study area to support wintering grouse. Core habitat, as delineated by Montana FWP to encompass areas with the largest population concentrations and associated habitats, is mapped in the extreme southern end of the study area. The proposed rail line would not disturb any habitats delineated as core habitat. Much of the remaining areas in the study area are defined by Montana FWP as general habitat, or areas that provide habitat for greater sage-grouse.

The study area does support a small population of greater sage-grouse. Thirty-seven historical observations were recorded between 1974 and 2011 in the study area; the majority of these observations were at known leks that were checked during baseline surveys in 2013 (Montana Natural Heritage Program 2013a, 2013b). Two observations of six birds were recorded during winter aerial surveys. A total of 20 known leks occur in the study area; 11 are on private lands, three are on Fort Keogh, two are on BLM lands, two are on Montana State lands, and two are on U.S. Forest Service lands. Of the 20 known leks in the study area, 11 are confirmed active, one is confirmed inactive, and eight are unconfirmed. A confirmed active lek is a lek with a minimum of 2 years of historic activity and two or more recorded males displaying, or with 1 year of activity and two or more males displaying followed with evidence of lekking the second year. A confirmed inactive lek is a lek with no sign of lek activity in the last 10 years supported by surveys conducted during 3 or more years over the 10-year period. An unconfirmed lek is a single observation (or count) with no subsequent survey or a reported lek without supporting survey data. OEA observed only three active leks, located in the northernmost portion of the study area, during spring 2013, with two males being the highest peak male count recorded. OEA did not document any new leks and observed only three sage-grouse during spring 2013 surveys.

Interior Least Tern

The interior least tern (*Sterna antillarum athalassos*) was listed as endangered under the ESA on May 28, 1985 (50 Fed. Reg. 21792). The interior least tern is a migratory water bird occurring throughout the central United States, from Texas to Montana and eastern Colorado to southern Indiana during the breeding season (April to August). Known breeding sites occur in isolated areas along major rivers, including the Arkansas, Missouri, Mississippi, Ohio, Platte, Red, and Rio Grande Rivers. Interior least terns use barren to sparsely vegetated riverine sandbars, sand, gravel pits, and lake and reservoir shorelines for nesting sites. Sandbars, the most common nesting substrate, are dynamic and change annually with the river dynamics. Most major rivers in the United States have been engineered for the purpose of navigation, hydropower, irrigation, and flood control, resulting in changes to river dynamics and in the elimination of most suitable nesting habitat throughout the interior least

tern's range (U.S. Fish and Wildlife Service 1990). In the fall, interior least terns migrate south for the winter to the northern coast of South America and the Caribbean.

Eastern Montana is at the extreme western edge of the interior least tern's range, and most known populations occur along the Missouri River in North Dakota and at the confluence of the Yellowstone River and Missouri River at the Montana–North Dakota border (U.S. Fish and Wildlife Service 1990). Montana does support a small breeding population of interior least terns (approximately 50 adult birds), which are found along the Missouri River between Fort Peck Reservoir and the North Dakota border as well as along the Yellowstone River below Miles City (Atkinson and Dood 2006). In the early 1990s, breeding interior least terns were documented in the region, including at one area 9 miles northeast of Miles City along the Yellowstone River that contained multiple breeding pairs (Montana Natural Heritage Program 2013a, 2013b).

Habitat along the Tongue River is inadequate to host breeding populations of interior least terns. Two dams between Decker and Miles City regulate the flow of the river and divert water for irrigation, which degrades minimally available habitats. Available sandbars along the Tongue River are small, low-lying, frequently flooded, and do not provide adequate nesting substrates for interior least terns.

Interior least terns could use habitat along the Tongue River during migration in mid- to late May and mid-August (Bureau of Land Management 2013), as migration patterns for the species typically follow major river systems to breeding sites (primarily the Missouri River in this part of the species' range). There is one record of a migrating interior least tern 4 miles from the study area at Castle Rock Lake near Colstrip (Atkinson and Dood 2006). Although no interior least terns have ever been documented in the Tongue River Valley or the study area, they could migrate through the study area. OEA did not observe migrating or breeding interior least terns during the 2013 baseline surveys.

Sprague's Pipit

The Sprague's pipit (*Anthis spragueii*) was listed as a candidate species on September 15, 2010 (75 Fed. Reg. 56028). The Sprague's pipit is a small migratory passerine bird (songbird) that winters in the south-central United States and breeds in the northern Great Plains and southern Canada. The Sprague's pipit is endemic to large, open, native mixed-grass prairies, and populations are declining as habitat is converted for agricultural fields and livestock overgrazing (Jones 2010). Reduced fire frequency may lead to the degradation of suitable habitats as shrubs and vegetative litter encroach on open grasslands in the absence of historical fire intervals (Jones 2010).

The Sprague's pipit requires large, contiguous habitat with a small edge-to-area ratio for breeding. Areas between 70 and 470 acres of contiguous habitat are needed to support the Sprague's pipit. Sprague's pipits nest in well-drained native grasslands with higher grass and sedge cover and less bare ground. Nest sites in Montana are positively associated with clubmoss cover and native grass species, and negatively associated with cactus and low-

growing shrubs. Sprague's pipits are not known to nest in croplands, but have been documented using hayfields in which the vegetation structure was similar to native grasslands (Jones 2010, Montana Natural Heritage Program and Montana Fish Wildlife & Parks n.d.-a).

Sprague's pipit populations in Montana are relatively stable and occur at low levels in the region (Bureau of Land Management 2013, Montana Natural Heritage Program and Montana Fish Wildlife & Parks n.d.-a, Montana Natural Heritage Program 2013a, 2013b). Minimal habitat to support Sprague's pipit exists in the northern portion of the study area, where areas of native prairie and mixed grass agriculture occur; however, these areas are classified as low suitability (Montana Natural Heritage Program 2012). Only one historical record observed in 1998 on Fort Keogh exists in the study area (Montana Natural Heritage Program 2013b). OEA did not observe pipits in the study area during 2013 baseline surveys.

Whooping Crane

The whooping crane (*Grus americana*) was listed as endangered under the ESA on March 11, 1967 (32 Fed. Reg. 4001). Whooping crane is one of two migratory cranes in the United States. There are four wild populations of the crane in the world: three experimental populations and one natural population. Two of the experimental populations occur in Florida and only one of these is migratory, moving between Florida and Wisconsin. The third experimental population is nonmigratory and is located in Louisiana. The natural population is the only self-sustaining population. This population winters along the Gulf Coast of Texas on the Arkansas National Wildlife Refuge and breeds on the Wood Buffalo National Park in northern Alberta Canada and adjacent Northwest Territories (U.S. Fish and Wildlife Service 2012).

Whooping cranes use agricultural fields and marshy wetlands on their migration route between the Texas Gulf Coast and Canada. Suitable stopover habitat consists of a mosaic of wetlands, including shallow, seasonally flooded marshy wetlands for roosting; agricultural fields; and emergent wetlands for feeding. However, riverine habitat may also be used by whooping cranes, particularly in certain areas along the Platte, North and Middle Loup, and Niobrara Rivers in Nebraska and the Missouri River in North Dakota. Cranes use submerged sandbars along these rivers as roosting sites (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

A migration corridor was identified, based on over 2,000 confirmed sightings and *radio telemetry* (a method for tracking wildlife movement) data for nine whooping cranes. This 200-mile-wide corridor encompasses 95 percent of observational data (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007, U.S. Fish and Wildlife Service 2012). The corridor covers a very small area of the northeast corner of Montana, more than 100 miles from the closest point of the study area (around Miles City).

Adequate migration stopover habitat (marshy wetlands needed for roosting and feeding) is extremely limited in the Tongue River Valley. While whooping crane migration stopovers

cannot entirely be ruled out in the study area, it is unlikely that the study area would be used during migration, as the vast majority of the migration corridor is located approximately 200 miles east of the study area. While two migrant whooping cranes have been documented historically in the region, no cranes have been observed in the study area (Montana Natural Heritage Program 2013a, 2013b), and OEA did not observe whooping cranes during the 2013 baseline surveys.

8.5.3.2 BLM Sensitive Species

BLM defines BLM Sensitive Species using the following criteria (Bureau of Land Management 2008).

- The species must be native and resident on BLM-administered lands.
- Data must demonstrate a reasonable threat to the viability of the species or population.
- The species must depend on habitat present on BLM-administered lands.
- The species has been federally designated as a candidate or proposed species, or was delisted in the previous 5 years.

Once a species is designated a BLM Sensitive Species, it is BLM's responsibility to manage the species' habitat. This includes undertaking conservation actions that will preclude these species from being listed under the ESA or that improve the status of the species so that the BLM Sensitive Species status is no longer needed. The Montana BLM State Director is responsible for designating sensitive species in Montana, and each BLM field office maintains a subset of that list that pertains specifically to its region. BLM Sensitive Species are species known to occur on BLM-administered lands or lands affected by BLM-authorized actions whose conservation status could be significantly affected by BLM management actions (Bureau of Land Management 2008, 2013).

Mammals

MNHP (2013a, 2013b) and the Northern Cheyenne Tribe (Roundstone pers. comm.) have documented four BLM Sensitive Mammal Species in the study area: swift fox, black-footed ferret, black-tailed prairie dog, and Townsend's big-eared bat (Table 8.5-1). OEA documented the following BLM Sensitive Mammal Species during 2013 baseline surveys: swift fox, black-tailed prairie dog, fringed myotis (a species of bat), and Townsend's big-eared bat.

Black-Footed Ferret

For information regarding the black-footed ferret, see Section 8.5.3.1, *Federally Listed, Proposed, and Candidate Species*.

Black-Tailed Prairie Dog

Black-tailed prairie dogs are considered a keystone species, and their colonies provide habitat and food resources for a variety of vertebrate species (Bonham and Lerwick 1976, Dinsmore et al. 2005, Esch et al. 2005, Knowles et al. 1982, Miller et al. 2000, Miller and Cully 2001, Nistler 2009, Sharps and Uresk 1990, Smith and Lomolino 2004). Prairie dog colonies in the region have suffered serious declines in the last few years due to poisoning, recreational shooting, and Sylvatic plague (Farmer 2012, FaunaWest Wildlife Consultants 2012, Montana Prairie Dog Working Group 2002); however, sylvatic plague has had the largest impact on local colonies. Colony size in the region ranges from 30.0 acres to 40.1 acres (FaunaWest Wildlife Consultants 2012). OEA observed black-tailed prairie dogs in the study area, and mapped active colonies in the study area in 2013. Thirty-six active colonies totaling 1,056.2 acres existed in the study area in 2013. Colony size ranged from 0.9 acre to 114.6 acres, with an average colony size of 29.3 acres.

Fringed Myotis

Fringed myotis is a migratory species and is believed to occur only in Montana during the breeding season (June to September). Known habitats used by this species include desert shrublands, sagebrush-grasslands, and woodlands. In Montana, they have been recorded roosting in woodlands composed of ponderosa pine and Douglas-fir and foraging along riparian areas composed of willow and cottonwood (Montana Natural Heritage Program and Montana Fish Wildlife & Parks n.d.-c). OEA documented fringed myotis using riparian habitats along the Tongue River during 2013 baseline surveys.

Swift Fox

Swift foxes use grassland habitats containing short grasses and mixed native grasses in gentle terrain where visibility is unobstructed. Swift foxes are opportunistic predators. They eat a variety of prey and vegetation but small mammals and insects make up most of their diet (Meyer 2009, Montana Natural Heritage Program and Montana Fish Wildlife & Parks n.d.-b). Swift fox populations in eastern Montana are potentially at risk; however, reintroduction efforts in northwestern Montana and southern Canada appear to be successful, as increased numbers of fox sightings have been reported. Foxes appear to be radiating to the east and south as populations increase and individuals disperse to new areas (Montana Natural Heritage Program and Montana Fish, Wildlife & Parks n.d.-b). OEA documented swift foxes in the northern portion of the study area, where larger expanses of grasslands occur, during 2013 baseline surveys.

Townsend's Big-Eared Bat

Townsend's big-eared bat is a year-round resident in the study area, using habitats for breeding and hibernation. This species needs larger areas such as mine sites or caves for maternity roosts and hibernacula; however, for foraging it uses woodlands composed of Douglas-fir, lodgepole pine, ponderosa pine, juniper sagebrush scrub, as well as riparian

areas consisting of cottonwood trees (Montana Natural Heritage Program and Montana Fish Wildlife & Parks n.d.-d). OEA documented Townsend's big-eared bat using riparian habitats at the confluence of the Tongue and Yellowstone Rivers during 2013 baseline surveys.

Birds

Eighteen BLM Sensitive Bird Species have been historically documented or were recorded by OEA during 2013 baseline surveys. Historically, 16 BLM Sensitive Bird Species have been documented in the study area, including five raptors, one upland game bird (greater sage-grouse), and 10 nongame bird species (Montana Natural Heritage Program 2013a, 2013b). During 2013 baseline surveys, OEA documented four raptors, greater sage-grouse, and nine nongame bird (including seven historically recorded and an additional two) BLM Sensitive Species (Table 8.5-1). For information regarding the greater sage-grouse, see Section 8.5.3.1, *Federally Listed, Proposed, and Candidate Species*.

Raptors

Five raptor species (bald eagle, burrowing owl, ferruginous hawk, golden eagle, and peregrine falcon) have been historically documented in the study area (Montana Natural Heritage Program 2013a, 2013b). OEA documented bald eagle, burrowing owl, ferruginous hawk, and golden eagle during 2013 baseline surveys.

Bald Eagle

Bald eagles use habitats in the study area for wintering, migration, and breeding. Bald eagles primarily inhabit wooded areas near large bodies of water. They build their nests in large, mature trees such as cottonwood and pine trees. Their diet consists primarily of fish, but they will eat other species such as birds, mammals, amphibians, and reptiles.

During winter months, bald eagles use winter concentration areas for roosting. These areas are important as adult eagles typically roost near nesting sites. Typically, the roosts are communal, composed of both adult and subadult eagles; however, they can also be solitary roosts. Roost sites in large, mature trees with greater canopy heights than surrounding trees provide a favorable microclimate and shelter from the wind. Roost sites are typically used every year. They are also close to water bodies that remain unfrozen in winter and are farther from human development (Anthony et al. 1982, Buehler et al. 1991).

Bald eagles are commonly seen along the Tongue and Yellowstone Rivers. OEA recorded 41 bald eagles roosting in the study area in 2013; 24 were adults, 12 were subadults, and five could not be identified (Figure 8.5-1). The majority of eagles were seen perched in cottonwood trees along the river; however, a few were noted in pine or juniper. OEA identified one winter concentration area containing between six and ten birds approximately 2 miles downstream from Tongue River Reservoir.

Nine historic bald eagle nests occur in the study area, and OEA documented an additional 14 nests in 2013. Eighteen nests were active, three were inactive, and two were not checked. Eight nests were inaccessible in 2013, and no information is available as to productivity or success of the nest. Two nests failed in 2013 due to unknown causes. Five nests were successful and produced nine fledglings. OEA could not determine the success of the remaining three nests, but observed eggs and nestlings in the nests prior to complete leaf-out of the nest tree (Figure 8.5-2).

Burrowing Owl

Burrowing owls use habitats in the study area for breeding. They inhabit dry, open areas with short, sparse grass and no trees. Burrowing owls nest in burrows that they line with manure, and which are typically associated with prairie dog colonies. They forage on insects, small mammals, birds, reptiles, and amphibians.

OEA recorded seven burrowing owls in the study area in 2013. OEA observed them all in prairie dog colonies in the northern extreme of the study area; however, OEA did not document any nests. OEA observed four inactive historic burrowing owl nests in 2013 (Figure 8.5-2).

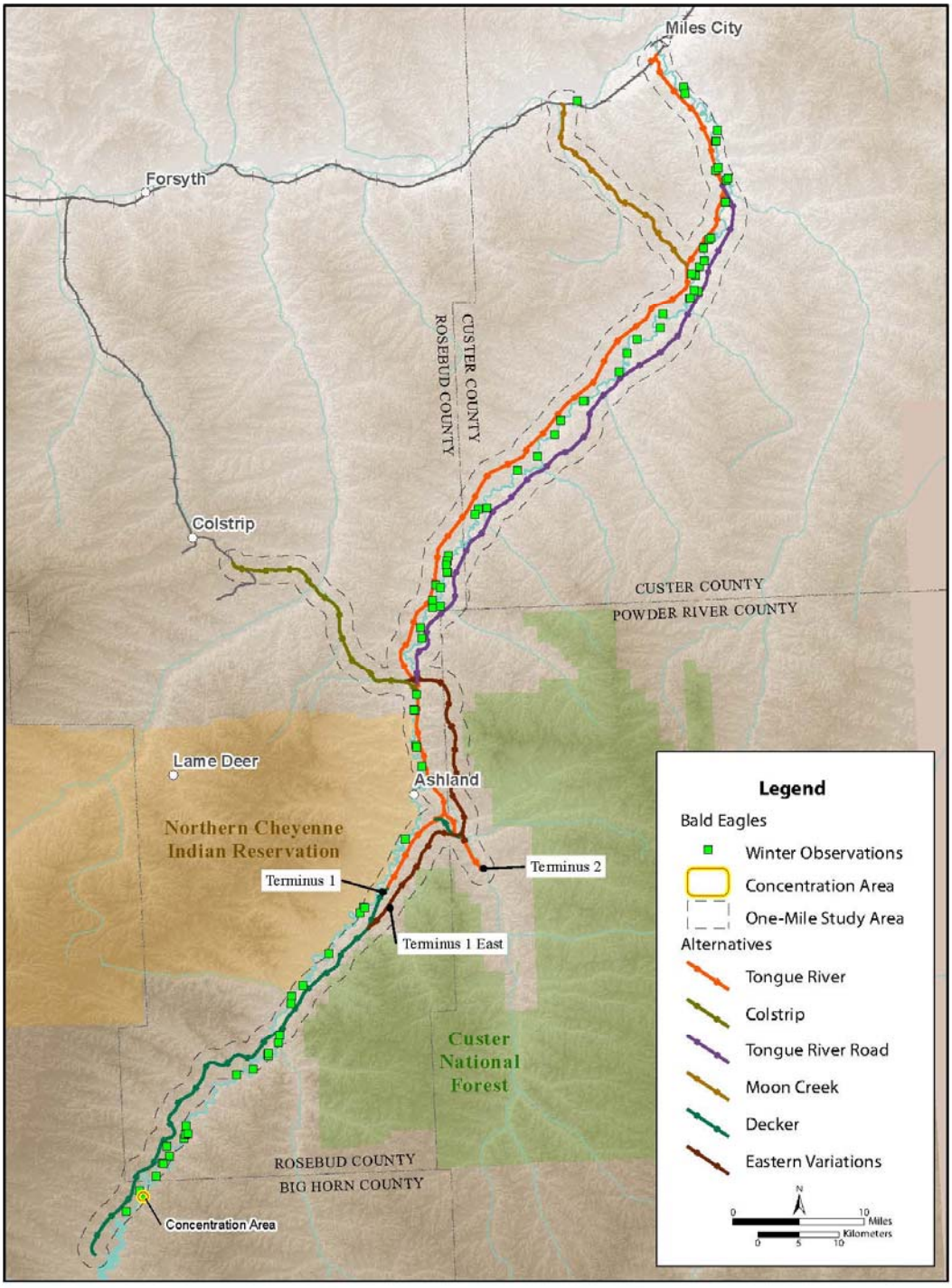

Figure 8.5-1. 2013 Bald Eagle Winter Roost Observations

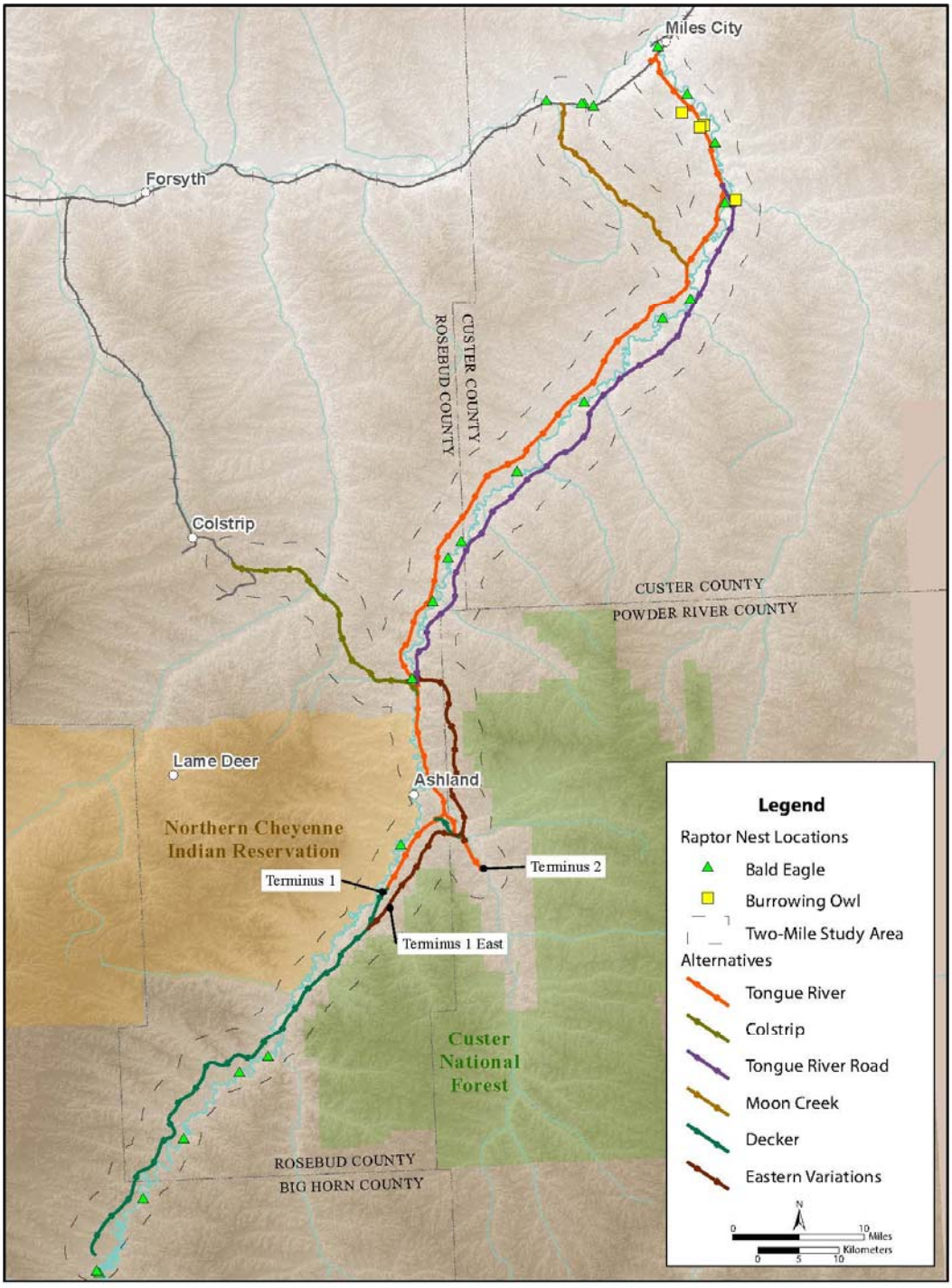

Figure 8.5-2. Raptor Nest Locations

Ferruginous Hawk

Ferruginous hawks use habitats in the study area to forage but are not known to breed there. Ferruginous hawks forage in mixed grassland and shrubland habitats in the study area. They prey on jackrabbits, but will also eat small mammals and small birds. OEA observed five ferruginous hawks in open habitats hunting on prairie dog colonies during 2013 baseline surveys. Most observations occurred north of Ashland where there is a higher concentration of grassland and gentler terrain.

Golden Eagle

Golden eagles are year-round residents, but some individuals are migrants. Golden eagles use a variety of habitats, from grasslands to woodlands; however, they are most often found in open areas around mountains or cliffs. They generally nest on cliffs but can also nest in trees or on human-made structures. Golden eagles eat a variety of small and medium sized mammals; however, jackrabbits are the main prey item.

Golden eagles are common throughout the study area. OEA documented them in all habitat types; however, most were documented perched on rock outcrops or bare hill tops. Seven historical nest records exist in the study area; however, all seven nests no longer exist. No golden eagles were known to breed in the study area in 2013.

Peregrine Falcon

Peregrine falcons use habitats in the study area to forage but are not known to breed there. Peregrine falcons inhabit areas where rocky cliffs and rivers, lakes, or other water bodies are readily available. They primarily forage on other bird species; however, they will occasionally take small mammals, insects, and fish. Peregrine falcons are rare in the region and study area. Only one occurrence, in 1979, was recorded in the study area.

Nongame Birds

Nongame BLM Sensitive Bird Species historically documented in the study area are the sage thrasher, Sprague's pipit, long-billed curlew, mountain plover, loggerhead shrike, Baird's sparrow, Brewer's sparrow, chestnut-collared longspur, veery, and red-headed woodpecker. OEA documented the following species during 2013 baseline surveys: the Franklin's gull, sage thrasher, long-billed curlew, loggerhead shrike, Baird's sparrow, Brewer's sparrow, chestnut-collared longspur, American bittern, and red-headed woodpecker (Table 8.5-1). Red-headed woodpecker prefers wooded habitats, and is found in riparian areas and recently burned woodland. Franklin's gull and American bittern require water features in their habitats. Whereas Franklin's gull is associated with more open water features, American bittern is more associated with wetlands. Sage thrasher, loggerhead shrike, and Brewer's sparrow are all strongly associated with shrubland habitats dominated by sagebrush. Sprague's pipit, long-billed curlew, mountain plover, Baird's sparrow, and chestnut-collared

longspur can all are found in grassland habitats. Long-billed curlew will also occupy moist meadows. Veery use mature riparian habitats with scrubby understory.

Reptiles and Amphibians

Six BLM Sensitive Reptile and Amphibian Species have been historically documented in the study area: four reptiles and two amphibians (Montana Natural Heritage Program 2013a, 2013b). The snapping turtle, spiny softshell turtle, great plains toad, and plains spadefoot all require water features in their habitats. Snapping turtle and spiny softshell turtle rely solely on water habitats, whereas plains spadefoot are found in adjacent riparian areas. Great plains toad will use a variety of other habitats, including shrubland, grassland, and agricultural fields. Milk snake and western hog-nosed snake are found in shrubland and grassland, but milk snake also use woodlands.

OEA documented great plains toad and plains spadefoot during 2013 baseline surveys. OEA also observed greater short-horned lizard, which can be found in grassland and shrubland.

Fish

In addition to the federal ESA-listed pallid sturgeon, which is also classified as a BLM Sensitive Species, three other BLM Sensitive Fish Species may occur in the study area: sturgeon chub, paddlefish, and sauger (Montana Natural Heritage Program 2013a, 2013b; Bureau of Land Management 2014). While all three species have been observed in the mainstem of the Tongue River, paddlefish rarely occur in the area. Sauger, unlike the other three BLM Sensitive Fish Species, is also known to occur in Rosebud Creek and in larger fish-bearing tributaries to the Tongue River, including Hanging Woman and Pumpkin Creek (Montana Fish, Wildlife & Parks 2012).

Plants

BLM does not list any special-status plants for the areas under jurisdiction of the Miles City Field Office (Bureau of Land Management 2014).

8.5.3.3 Montana Species of Concern

Montana FWP maintains a list of wildlife and fish species designated as Montana Species of Concern. These native species are known to breed in Montana and their population is considered at risk because of population decline, threat to habitat, and/or restricted distribution. Montana FWP uses this list to prioritize research and management needs for conservation efforts.

Montana FWP uses a standardized ranking system for all wildlife known to occur in Montana. Species are assigned a rank of 1 to 5, with 1 being of greatest concern and 5 being relatively secure.

- A rank of 1 represents a population at high risk because of extremely limited and/or rapidly declining population numbers, range, and/or habitat, making it highly vulnerable to extinction or extirpation in the state.
- A rank of 2 is a population at risk because of very limited and/or potentially declining population numbers, range, and/or habitat, making it vulnerable to extinction or extirpation in the state.
- A rank of 3 is a population potentially at risk because of limited and/or declining population numbers, range, and/or habitat, even though it may be abundant in some areas.
- A rank of 4 is a population that is apparently secure, though it may be rare in parts of its range, and/or suspected to be declining.
- A rank of 5 is a population that is common, widespread, and abundant (although it may be rare in parts of its range) and is not vulnerable in most of it range.

Species with a rank of 1, 2, or 3 are classified as a Montana Species of Concern. These species include those listed under ESA or identified as a BLM Sensitive Species. Species with a rank of 4 or 5 are not considered a Montana Species of Concern.

MNHP (2013a, 2013b) has documented 39 wildlife species of concern in the study area: five mammals, 28 birds, and six reptiles or amphibians. OEA recorded 32 of these species during 2013 baseline surveys: five mammals, 24 birds, one reptile, and two amphibians (Table 8.5-1).

Montana Species of Concern not previously discussed in Sections 8.5.3.1, *Federally Listed, Proposed, and Candidate Species*, and 8.5.3.2, *BLM Sensitive Species*, are the hoary bat, black-billed cuckoo, yellow-billed cuckoo, Cassin's finch, bobolink, pinyon jay, Clark's grebe, common loon, American white pelican, green-tailed towhee, evening grosbeak, alder flycatcher, sagebrush sparrow, great blue heron, and Lewis's woodpecker. Lewis's woodpecker has a state rank of 2, meaning populations are at risk. All other species have a state rank of 3, meaning populations are potentially at risk.

Hoary bat uses forested habitats as well as riparian woodlands for foraging. Black-billed cuckoo, yellow-billed cuckoo, and alder flycatcher use mature riparian habitats with scrubby understory. American white pelican, great blue heron, Clark's grebe, common loon, and American bittern need a water component in their habitats. All of these species are associated with wetlands, but American white pelican, Clark's grebe, common loon, and great blue heron are also found near major bodies of water including rivers and lakes. Cassin's finch, green-tailed towhee, and evening grosbeak use primarily woodland habitats. Green-tailed towhee also requires shrubby habitat associated with edge habitats. Sagebrush sparrow is found in habitat dominated by sagebrush. Bobolink uses grasslands and old agricultural fields for habitat. Pinyon jay and Lewis's woodpecker use primarily woodland habitats, but Lewis's woodpecker can also be found in river-bottom woodlands and recent burns.

Montana Fish Species of Concern include the four BLM Sensitive Fish Species (Section 8.5.3.2, *BLM Sensitive Species*) plus the blue sucker. Pallid sturgeon is a rank 1 species of concern, paddlefish and sauger are rank 2, and blue sucker and sturgeon chub are each rank 2/3 (indicating uncertainty regarding the status of these two species). Detailed descriptions of these sensitive fish species, their preferred habitats, and distribution in the study area are provided in Section 8.4, *Fish*. One other sensitive fish species, Yellowstone cutthroat trout is known to occur in the headwaters of the Tongue River, but it is not believed to occur in the Tongue River downstream of the Wyoming border and is therefore not present in the study area.

Ten special-status plant species occur or potentially occur in the study area. MNHP (2013) has documented known (current or historical) locations of nine Montana special-status plant species in the study area, primarily in three areas.

- Around Miles City and just west of Miles City (Schweinitz' flatsedge, large flowered beardtongue, bractless blazingstar, and slender-branched popcorn-flower).
- Colstrip area (Barr's milkvetch and narrowleaf milkweed).
- Between Ashland and Decker (bractless blazingstar, Barr's milkvetch, heavy sedge, woolly twinpod and Nuttall desert-parsley).

OEA document one or more of these nine species in 16 of the 41 subwatersheds that would be crossed by a build alternative but MNHP does not document any special-status plants in 25 subwatersheds crossed by the build alternatives. MNHP has not documented double bladderpod in the study area, but MNHP's Predicted Suitable Habitat Model for this species shows potential high, medium, and low-quality habitat just east of Ashland and between Ashland and Decker. Other scattered areas of potential habitat for double bladderpod are found between Colstrip and Miles City.

8.5.3.4 USFWS Birds of Conservation Concern

USFWS maintains a Birds of Conservation Concern list that identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. No Birds of Conservation Concern are considered special-status species, but many of the species are BLM Sensitive Bird Species, Montana Species of Concern, or USFWS special-status species. The Birds of Conservation Concern list includes nongame birds; game birds without hunting seasons; subsistence hunting nongame birds in Alaska; and ESA candidate, proposed, endangered, or threatened, and recently delisted species. USFWS has delineated Birds of Conservation Concern Regions across North America. Each region represents an ecologically distinct region with similar bird communities, habitats, and resource management issues. The proposed rail line would be in Region 17, which includes southeast Montana, southwest North Dakota, northwest South Dakota, and northeast Wyoming. There are 28 bird species listed for Region 17, and 23 of these species were historically recorded in the study area or

were documented by OEA during 2013 baseline surveys. Fifteen of these bird species are also listed as BLM Sensitive Species and 18 are also listed as Montana Species of Concern. These species are covered in previous sections (Table 8.5-1 provides a complete list of these species). The remaining Birds of Conservation Concern documented in the study area—prairie falcon, upland sandpiper, grasshopper sparrow, and short-eared owl—are not special-status species and are covered in Section 8.3.3.2, *Birds*. Five Birds of Conservation Concern listed for Region 17 do not occur in the study area: the horned grebe, yellow rail, marbled godwit, McCown's longspur, and dickcissel.

8.5.4 Environmental Consequences

Impacts on special-status species could result from construction and operation of any build alternative. The impacts common to all build alternatives are presented first, followed by impacts specific to the build alternatives.

8.5.4.1 Impacts Common to All Build Alternatives

Construction

The construction impacts on special-status species would be the same as those described in the respective common impact sections of Section 8.2, *Vegetation*, Section 8.3, *Wildlife*, and Section 8.4, *Fish*. Impacts associated with construction of the proposed rail line would include an increase in mortality, habitat loss, habitat degradation, habitat alteration, wildlife displacement, and barriers to movement.

Operation

The operation impacts on special-status species would the same as those described in described in the respective common impact sections of Section 8.2, *Vegetation*, Section 8.3, *Wildlife*, and Section 8.4, *Fish*. Impacts associated with operation of the proposed rail line would include an increase in mortality, habitat loss, habitat degradation, habitat alteration, wildlife displacement, and barriers to movement.

Taxa-Specific Impacts Common to All Build Alternatives

Federally Listed and Candidate Species

Pallid Sturgeon

The pallid sturgeon is located in the Miles City Fish Hatchery, which would be located close to the Tongue River Alternatives or the Tongue River Road Alternatives. Impacts on pallid sturgeon at the hatchery are discussed under those build alternatives in Section 8.5.4.2, *Impacts by Build Alternative* (fish).

Black-Footed Ferret

There would be no common impacts on black-footed ferret because its habitat is limited in the study area. Impacts on black-footed ferret are discussed in Section 8.5.4.2, *Impacts by Build Alternative* (wildlife).

Whooping Crane

There would be no common impacts on the whooping crane because the species is not listed in the counties where any of the Decker Alternatives or Colstrip Alternatives would be constructed. Impacts on whooping crane from the other build alternatives are discussed in Section 8.5.4.2, *Impacts by Build Alternative* (wildlife).

Interior Least Tern

Habitats in the study area do not support breeding interior least terns, and limited habitat is available in the Tongue River for stopover sites during migration. The closest known breeding occurrence of the species is 9 miles northeast of Miles City. In the unlikely event that interior least terns were in the project area, they would be transient. Impacts could include noise related to construction and operation; however, these impacts would be short-term or temporary. Therefore, construction and operation of a build alternative *may affect* the interior least tern due to potential noise impacts, *but are not likely to adversely affect*[2] the species due to the limited habitat availability and their extremely low occurrence in the region (Appendix L, *Biological Assessment*).

Greater Sage-Grouse

Marginal habitat is present to support greater sage-grouse through the breeding and brood rearing seasons, and inadequate habitat exists for wintering grouse. A small local population does exist throughout the study area and surrounding vicinity, and historic leks occur along all build alternatives. Impacts from construction and operation would include loss of nesting and brood rearing habitat; collisions with vehicles, trains, and associated infrastructure (fences); animal displacement due to noise, associated infrastructure, and increased human activity; increased raptor, *corvid*, and mammalian predation; and decreased food availability or quality.

It is generally accepted that development negatively affects local greater sage-grouse populations (Aldridge and Boyce 2007, Aldridge 2005, Doherty et al. 2008, Holloran 2005, Lyon and Anderson 2003, Walker et al. 2007). However, these studies were conducted in oil and gas fields with associated activities, roads, and infrastructure, where causation for the decrease in local populations cannot be isolated. Recent evidence suggests that greater sage-grouse avoid noise from human activities independent of disturbance, associated

[2] NEPA uses the terms *effects* and *impacts* interchangeably. For consistency, this EIS generally refers to *impacts* on all resources. However, the language of the federal Endangered Species Act refers to effects on species, and, when necessary, the language of the determination reflects this preference for *effects*.

infrastructure, and habitat fragmentation. Also, intermittent noise, such as traffic noise, has more of an effect on distribution than continuous noise (Blickley et al. 2012). Impacts from construction and operation activities could affect local populations; however, because of low occurrences, large areas of unsuitable habitat, and regionally low population levels, construction and operation of a build alternative would not likely affect greater sage-grouse populations or persistence of the species. Therefore, construction and operation of any build alternative *may affect, but would not likely adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).[3]

Sprague's Pipit

There would be no common impacts on Sprague's pipit because its habitat is limited in the study area. Impacts on Sprague's pipit are discussed in Section 8.5.4.2, *Impacts by Build Alternative* (wildlife).

BLM Sensitive Species

Bat Species

Impacts on BLM Sensitive Bat Species would include habitat loss (river crossings and roosting sites in woodland and riparian habitats), habitat alteration, and degradation. Impacts from increased noise and light levels, especially at night, could disrupt foraging habitats, causing decreased foraging success or forcing species to find habitats that are more suitable.

Nongame Birds

Impacts on BLM Sensitive Nongame Birds would be in proportion to the loss of adequate habitat, degradation of vegetative cover, and the tolerance of individual species to disturbance. Construction and operation of any build alternative would cause habitat loss and alterations affecting all species. Construction of any build alternative across wetlands and lowlands would alter the suitability of nearby habitats because of changes in water abundance and distribution. The Franklin's gull, American bittern, and long-billed curlew would be affected. The loss of nest trees and suitable cavities would affect bird reproduction in subsequent years because birds would spend energy establishing new nests and cavities. Any build alternative would affect foraging habitat for all species.

Construction and operation of any build alternative would cause habitat fragmentation and associated changes in species composition. The loss of species diversity would be higher in avian communities that are particularly sensitive to habitat fragmentation, including sage thrasher, Brewer's sparrow, Sprague's pipit, mountain plover, Baird's sparrow, and chestnut-collard longspur. Species abundance and diversity would change in response to vegetation clearing and changes within the right-of-way, especially in larger contiguous habitats and

[3] Under the ESA, candidate species are provided no statutory protection, and effects determinations are not required. However, OEA has made an effects determination for each federal candidate species should it be listed in the future before the Record of Decision on the proposed rail line is issued.

complex habitat structures. Displacement of species would occur in response to increased noise and human activity.

Construction and operation of any build alternative would reduce habitat suitability, affecting bird survival and reproductive potential. Rail operation would disturb incubating birds due to train movement and associated noise. This disturbance would decrease reproductive success by causing incubating birds to rouse or fly off (flushing). Flushed birds could alert predators to the presence of a nest, thereby increasing the rate of predation. Flushing could also contribute to nest failure if the incubating bird is flushed frequently or is kept away from the nest, causing the eggs or nestlings to freeze.

Infrastructure associated with construction would also affect species survival and reproductive success. Power lines and fences would provide perches for predatory birds, facilitating predation on ground-nesting birds. These same structures are used by many songbird species as song perches, which could increase individual reproductive success. The structures would also present a collision hazard, especially for larger migrating birds.

Reptiles and Amphibians

BLM Sensitive Reptiles and Amphibians are associated with water features and upland habitats such as grassland and shrubland. Impacts associated with any build alternative would include habitat loss, fragmentation, and alteration; increased mortality from traffic collisions and predation; and barriers to movement. Construction and operation of the proposed rail line could alter habitats by changing water flow regimes and causing some temporary water features to become dry or other areas to become moist or flooded. In dry years especially, the proposed rail line would impede the distribution of species and of gene flow in populations by preventing individuals that occupy upland habitats during most of their life cycle from accessing more permanent water sources during the breeding season.

Fish

Impacts on BLM Sensitive Fish Species would include habitat loss, alteration, or degradation at river crossings or where riparian habitat would be disturbed. Any build alternative could also alter habitat conditions by changing stream flow regimes. Impacts could include the disruption of spawning, rearing, and/or migratory behavior and success.

Montana State Species of Concern

Most of the Montana State Species of Concern are also BLM Sensitive Species, and impacts on those species are already described above. Wildlife species unique to the Montana State Species of Concern list include hoary bat, black-billed cuckoo, yellow-billed cuckoo, Cassin's finch, bobolink, pinyon jay, Clark's grebe, common loon, American white pelican, green-tailed towhee, evening grosbeak, sagebrush sparrow, alder flycatcher, great blue heron, and Lewis's woodpecker. Impacts on these species would be the same as presented in the *Bat Species* and *Nongame Birds* sections above. These species primarily use woodland and

wetland habitats, and impacts on these habitats would affect these species. One special-status fish is unique to the Montana State Species of Concern list: the blue sucker. Impacts on this species would be as described in the *Fish* section above.

8.5.4.2 Impacts by Build Alternative

The impacts on special-status species that are specific to each build alternative are described below and are represented in the following tables and figures.

- Table 8.5-3 shows the amount of total habitat, general sage-grouse habitat, and prairie dog habitat that would be removed from each right-of-way.
- Table 8.5-4 shows the number of active prairie dog colonies in or near each right-of-way.
- Table 8.5-5 shows the number of active raptor nests in or near each right-of-way.
- Table 8.5-6 shows the number of sage-grouse leks and lek activity in or near each right-of-way.
- Table 8.5-7 shows special-status bird species richness and abundance in the study area.
- Table 8.5-8 shows species richness and abundance of reptiles and amphibians in the study area.
- Table 8.5-9 shows the number of wintering bald eagles within 1 mile of the rights-of-way.
- Table 8.5-10 shows acres of suitable habitat for special-status plants in the right-of-way by build alternative.
- Table 8.5-11 shows acres of suitable habitat for special-status plants outside of the right-of-way of each build alternative that would be affected by road relocations.
- Figures 8.5-3a and 8.5-3b shows the active black-tailed prairie dog colonies in the study area.
- Figure 8.5-4 shows the greater sage-grouse presence in the study area.
- Figure 8.5-5 shows the MNHP-documented special-status plant locations near the Moon Creek and Decker Alternatives

Table 8.5-3. Habitat Removal in the Right-of-Way and Road Relocations (acres)

Build Alternative	All Habitats	Greater Sage-grouse General Habitat	Prairie Dog Colony Habitat
Tongue River	3,813.2	1,656.2	51.0
Tongue River East	3,824.0	1,870.5	51.0
Colstrip	2,078.5	759.7	1.5
Colstrip East	2,122.0	974.0	1.5
Tongue River Road	4,263.6	2,169.4	50.1
Tongue River Road East	4,237.9	2,383.7	50.1
Moon Creek	4,061.1	2,385.8	45.2
Moon Creek East	4,071.9	2,600.1	45.2
Decker	2,841.8	1,458.4	1.5
Decker East	2,710.8	1,625.6	1.6

Table 8.5-4. Active Prairie Dog Colonies Documented During 2013 Baseline Surveys

Build Alternative	Number of Colonies in the Right-of-Way	Number of Colonies to Exceed 80 Acres[a]	Number of Colonies in the 0.5-mile Study Area
Tongue River	10	1	26
Tongue River East	10	1	26
Colstrip	1	0	2
Colstrip East	1	0	2
Tongue River Road	5	3	16
Tongue River Road East	5	3	16
Moon Creek	11	0	23
Moon Creek East	11	0	23
Decker	1	0	3
Decker East	2	0	3

Notes:

[a] Number of active colonies in the right-of-way that exceed 80 acres needed to support black-footed ferrets. There are no colonies that exceed 80 acres outside of the right-of-way but within the 0.5 mile study area; therefore, the only build alternatives that could affect black-footed ferrets are the Tongue River, Tongue River East, Tongue River Road, and Tongue River Road East Alternatives.

Table 8.5-5. Number of Special-Status Raptor Nests in the Study Area

Build Alternative	Right-of-Way[a]	0.25-mile[b]	0.5-mile[c]	2-mile[d]
Tongue River	0	4	6	17
Tongue River East	1	4	4	17
Colstrip	0	0	1	2
Colstrip East	0	1	1	2
Tongue River Road	0	2	7	17
Tongue River Road East	0	2	7	17
Moon Creek	0	1	2	13
Moon Creek East	1	0	1	13
Decker	0	0	0	7
Decker East	0	0	0	7

Notes:
[a] Number of nests that are in the right-of-way and road relocations and would be removed during construction activities
[b] Number of nests that would be highly affected, including abandonment of territories, nests, or young
[c] Number of nests that would be affected, resulting in decreased reproductive success
[d] Number of nests associated with raptor pairs using foraging habitat that would be affected by construction activities

Table 8.5-6. Greater Sage-Grouse Leks and Male Activity in the Study Area

	Distance from Right-of-Way		Active Leks[a]		Total Peak
Build Alternative	2 miles	4 miles	2 miles	4 miles	Male Count[b]
Tongue River	7	12	1	0	1
Tongue River East	8	13	1	0	1
Colstrip	3	4	0	0	—
Colstrip East	4	5	0	0	—
Tongue River Road	4	12	1	1	2
Tongue River Road East	5	13	1	1	2
Moon Creek	5	10	1	1	3
Moon Creek East	6	11	1	1	3
Decker	3	4	0	0	—
Decker East	3	4	0	0	—

Notes:
[a] Number of active leks within 4 miles of the right-of-way in 2013
[b] Sum of peak male counts at the various leks within 4 miles of the right-of-way in 2013

Table 8.5-7. Special-Status Bird Species Richness and Abundance in the Study Area

	Diurnal[a]		Nocturnal[b]	
Build Alternative	**Richness[c]**	**Abundance[d]**	**Richness[c]**	**Abundance[d]**
Tongue River	4	0.17	5	0.12
Tongue River East	4	0.19	3	0.11
Colstrip	1	0.06	4	0.19
Colstrip East	1	0.11	2	0.33
Tongue River Road	6	0.17	4	0.11
Tongue River Road East	6	0.21	2	0.10
Moon Creek	4	0.11	4	0.10
Moon Creek East	4	0.13	2	0.08
Decker	2	0.13	3	0.12
Decker East	2	0.15	3	0.14

Notes:
[a] Diurnal point counts were conducted in the 1-mile study area
[b] Nocturnal point counts were conducted in the 0.5-mile study area
[c] Richness = total number of special-status species recorded during point count surveys
[d] Abundance = total number of individual special-status species divided by the number of times surveyed. Number of times surveyed varied for each build alternative due to the different build alternative lengths and land access restrictions.

Table 8.5-8. Special-Status Amphibian Richness and Abundance and Reptile Richness in the Study Area

Build Alternative	**Reptile Richness[a]**	**Amphibian Richness[a]**	**Amphibian Abundance[b]**
Tongue River	0	2	0.07
Tongue River East	1	1	0.05
Colstrip	0	1	0.08
Colstrip East	1	0	0.00
Tongue River Road	0	2	0.17
Tongue River Road East	1	2	0.19
Moon Creek	0	2	0.24
Moon Creek East	1	2	0.29
Decker	0	2	0.16
Decker East	1	2	0.18

Notes:
[a] Richness = total number of special-status species recorded during 2013 baseline surveys
[b] Abundance = total number of special-status amphibians detected during nocturnal call surveys divided by the number of times surveyed. Number of times surveyed varied for each build alternative due to the different build alternative lengths and land access restrictions.

Table 8.5-9. Wintering Bald Eagles within 1 Mile of Each Right-of-Way

Build Alternative	Winter Roosts	Winter Concentration Area	Wintering Bald Eagles[a]
Tongue River	18	0	23
Tongue River East	16	0	21
Colstrip	3	0	3
Colstrip East	0	0	0
Tongue River Road	16	0	20
Tongue River Road East	13	0	17
Moon Creek	13	0	16
Moon Creek East	11	0	14
Decker	9	1	16
Decker East	7	1	14

Notes:
[a] Number of bald eagles calculated as an average over three winter aerial surveys

Table 8.5-10. Suitable Habitat for Specials-Status Plants in Right-of-Way by Build Alternative (acres)

Build Alternative	Barr's Milkvetch	Double Bladderpod	Heavy Sedge	Large Flowered Beardtongue	Nuttall Desert-Parsley	Slender-Branched Popcorn-Flower	Woolly Twinpod	Narrowleaf Milkweed
Tongue River	9.1	31.5	132.2	12.5	<1	28.8	317.2	<1
Tongue River East	102.1	7.0	147.0	15.6	<1	32.3	149.8	<1
Colstrip	8.8	28.3	34.4	6.1	-	8.1	340.4	1.3
Colstrip East	101.7	3.8	48.2	10.2	-	18.4	168.9	1.3
Tongue River Road	3.2	28.3	113.4	69.4	<1	31.4	323.4	-
Tongue River Road East	96.2	3.8	125.7	72.5	<1	33.3	155.3	-
Moon Creek	9.1	31.5	143.9	12.9	-	26.3	318.5	<1
Moon Creek East	102.1	7.0	158.7	16.0	-	29.8	151.2	<1
Decker	1,209.3	127.7	49.8	23.4	330.4	9.5	1,125.4	-
Decker East	1,239.4	127.7	49.8	28.9	330.4	8.6	1,064.4	-

Notes:

There is no predicted suitable habitat in any right-of-way for Schweinitz' flatsedge or bractless blazingstar. For species with MNHP (2009) predicted suitable habitat models—acreages for low, medium, and high suitable habitat potential are combined and reported as one acreage in the table.

Sources: MNHP predicted suitable habitat models (2009) for bractless blazingstar, Schweinitz' flatsedge, narrowleaf milkweed, Barr's milkvetch, woolly twinpod, Nuttall desert-parsley, and double bladderpod. Predicted suitable habitat for heavy sedge based on the MNHP's Montana Land Cover Framework (2013), specifically the "Great Plains Wooded Draw and Ravine" and "Great Plains Riparian" vegetation cover classes data. Predicted suitable habitat for slender-branched popcorn-flower based on OEA wetlands field work (2013), specifically PEM, PAB, PUB and PUS wetland types. Predicted suitable habitat for large flowered beardtongue based on the MNHP's Montana Land Cover Framework (2013), specifically the "Great Plains Sand Prairie" vegetation cover class.

Table 8.5-11. Suitable Habitat for Specials-Status Plants for Road Relocations Outside of Right-of-Way by Build Alternative (acres)

Build Alternative	Barr's Milkvetch	Double Bladderpod	Heavy Sedge	Large Flowered Beard Tongue	Narrowleaf Milkweed	Woolly Twinpod
Tongue River	-	<1	<1	<1	-	5.0
Tongue River East	-	-	<1	<1	-	-
Colstrip	<1	<1	1.4	<1	<1	5.7
Colstrip East	<1	-	1.3	<1	<1	<1
Tongue River Road	-	<1	1.2	<1	-	5.0
Tongue River Road East	-	-	1.2	<1	-	<1
Moon Creek	-	<1	1.2	<1	-	5.0
Moon Creek East	-	-	1.1	<1	-	<1
Decker	<1	-	<1	-	-	1.3
Decker East	<1	-	<1	-	-	<1

Notes:

There is no predicted suitable habitat within any road relocation for any build alternative for Schweinitz' flatsedge, bractless blazingstar, slender-branched popcorn-flower, or narrowleaf milkweed. For species with MNHP (2009) predicted suitable habitat models—acreages for low, medium, and high suitable habitat potential are combined and reported as one acreage in the table. Sources: MNHP predicted suitable habitat models (2009) for bractless blazingstar, Schweinitz' flatsedge, narrowleaf milkweed, Barr's milkvetch, woolly twinpod, Nuttall desert-parsley, and double bladderpod. Predicted suitable habitat for heavy sedge based on the MNHP's Montana Land Cover Framework (2013), specifically the "Great Plains Wooded Draw and Ravine" and "Great Plains Riparian" vegetation cover classes data. Predicted suitable habitat for slender-branched popcorn-flower based on OEA wetlands fieldwork (2013), specifically PEM, PAB, PUB and PUS wetland types. Predicted suitable habitat for large flowered beardtongue based on the MNHP's Montana Land Cover Framework (2013), specifically the "Great Plains Sand Prairie" vegetation cover class.

Impact acreages are only for where the road relocations would be outside of the right-of-way (because road relocation impacts inside the right-of-way have been accounted for in Table 8.5-10).

MNHP = Montana Natural Heritage Program; PEM = palustrine emergent; PAB = palustrine aquatic bed; PUB = palustrine unconsolidated bottom; PUS = palustrine unconsolidated shoreline

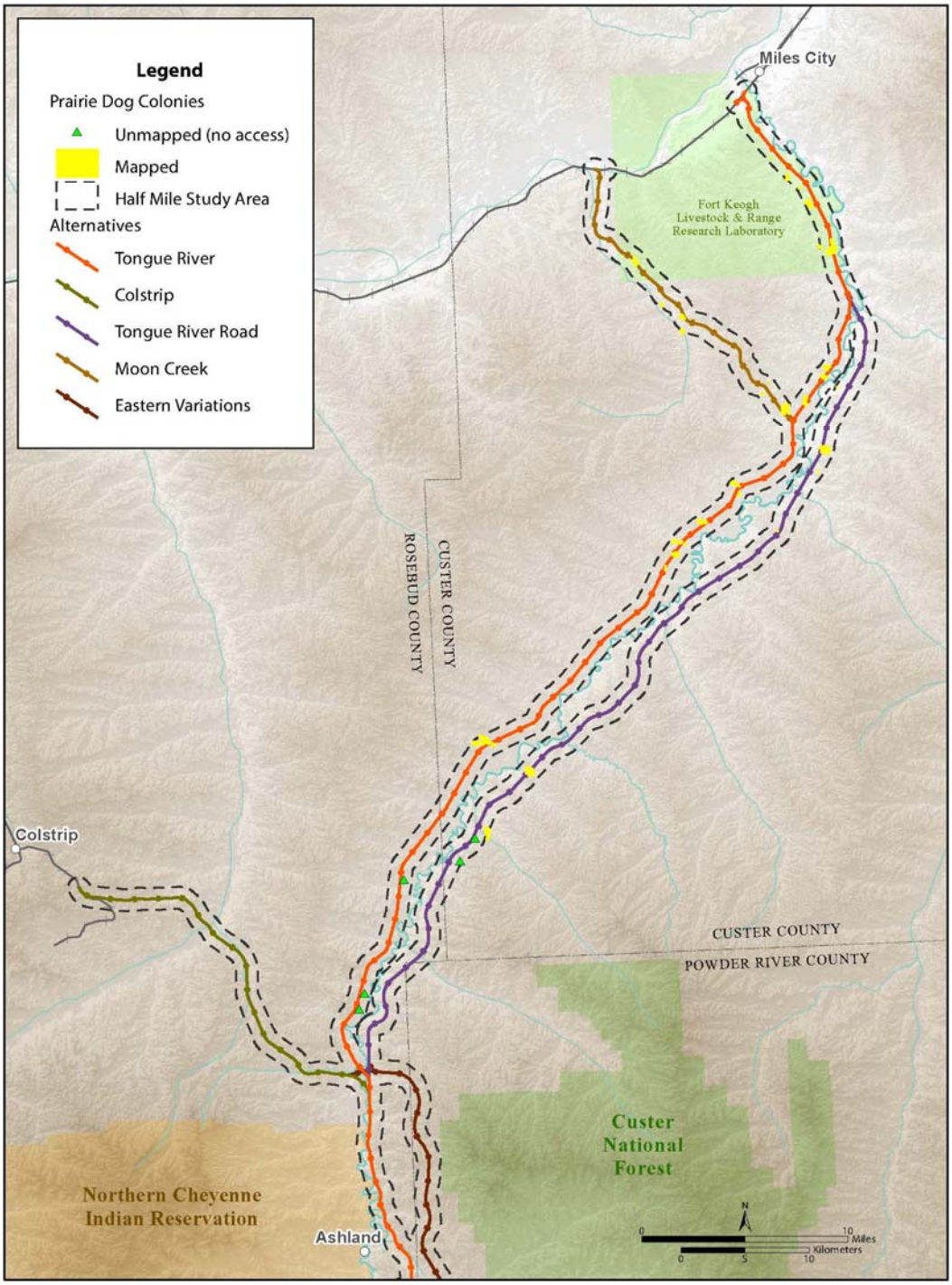

Figure 8.5-3a. Black-tailed Prairie Dog Colonies

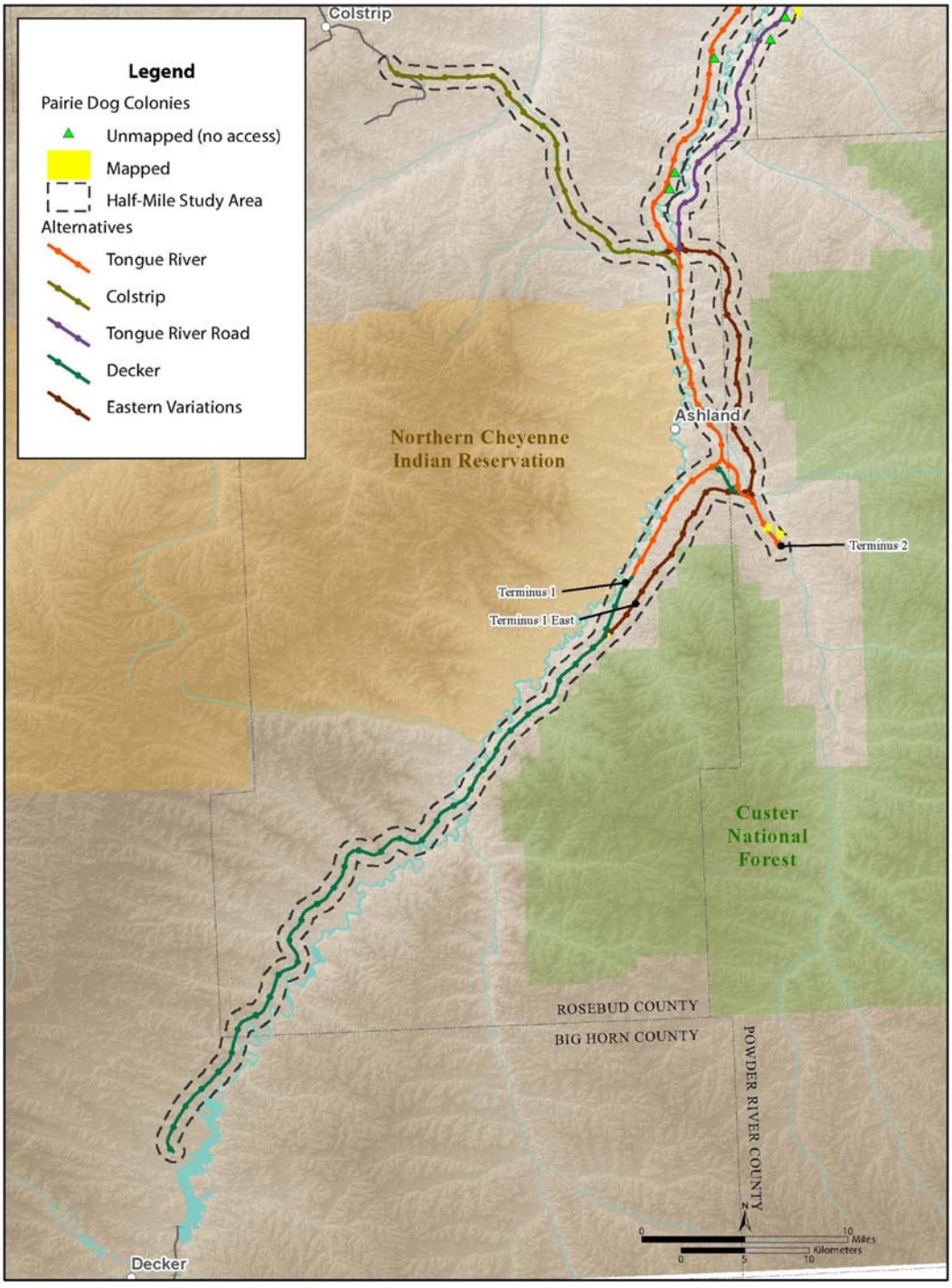

Figure 8.5-3b. Black-Tailed Prairie Dog Colonies

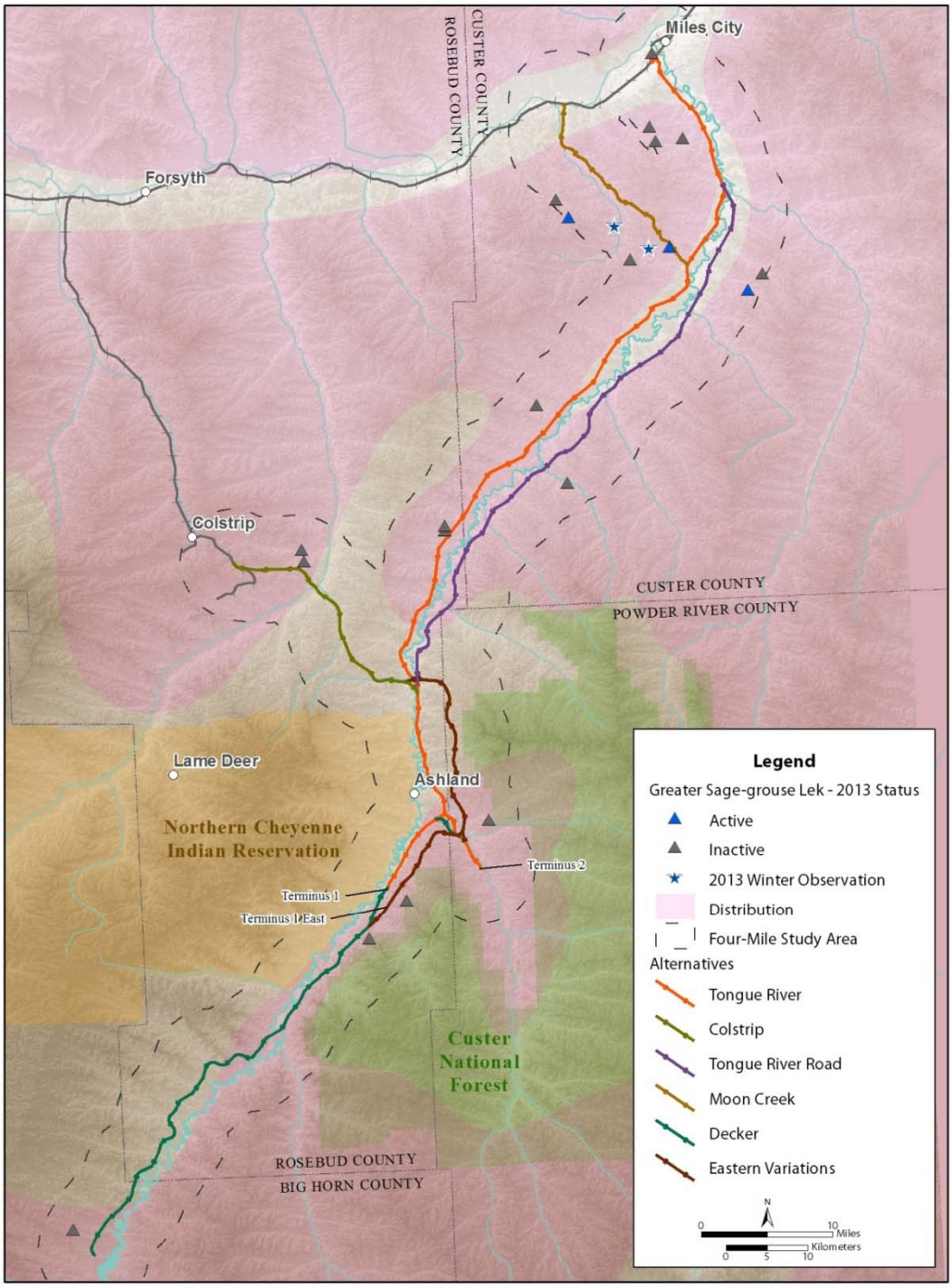

Figure 8.5-4. Greater Sage-Grouse

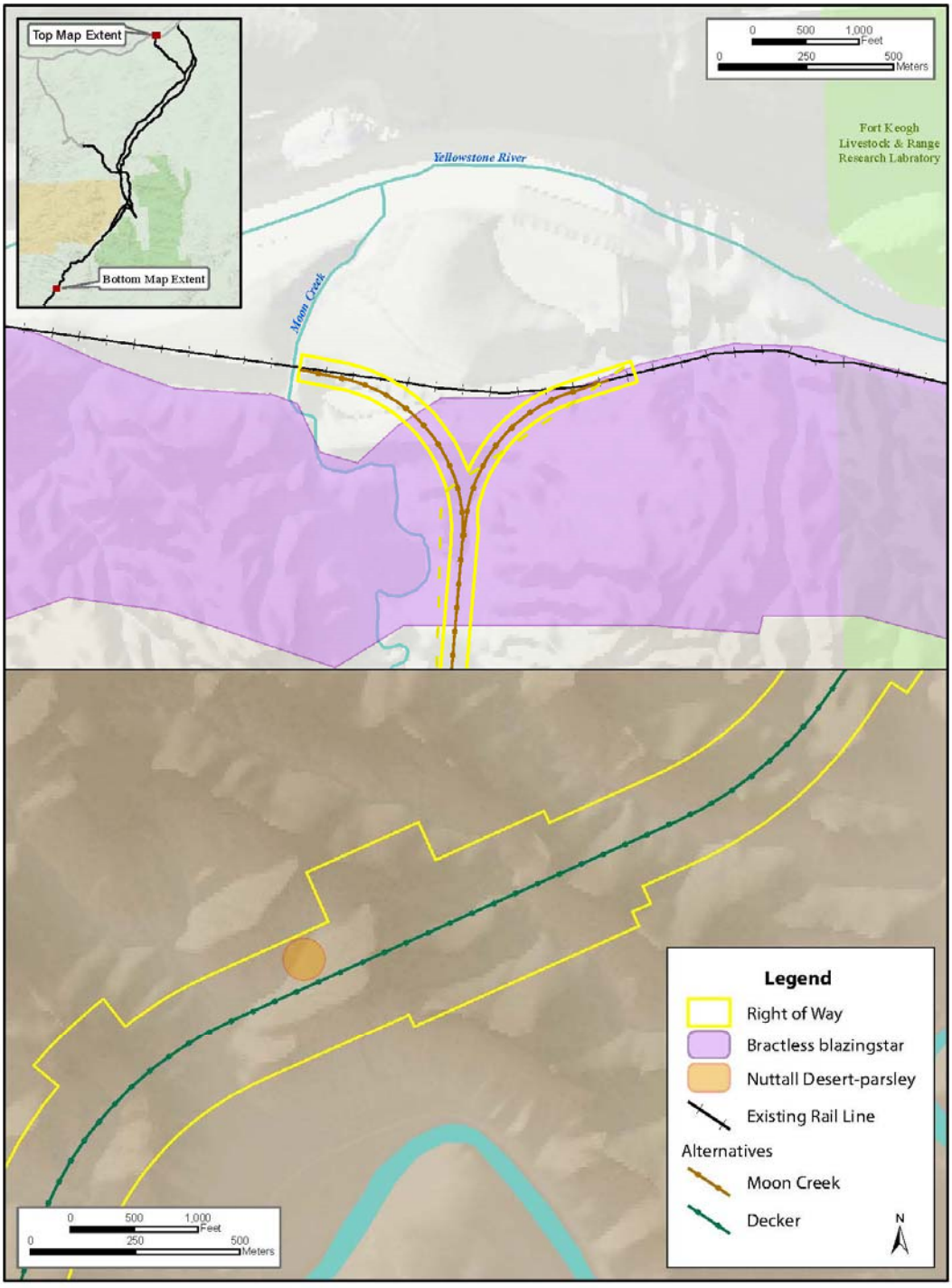

Figure 8.5-5 MNHP Documented Special Status Plant Locations

Tongue River Alternatives

Tongue River Alternative

Construction of the Tongue River Alternative would affect primarily grassland and shrubland habitats. Riparian habitat would be affected at river and tributary crossings and small amounts of woodland habitats would be affected in the Ashland area. Construction of the Tongue River Alternative would result in the removal of 3,813.2 acres of wildlife habitat within the right-of-way and road relocation footprints, most of which is suitable habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. The sections below describe the specific impacts of the Tongue River Alternative on each of the special-status species groups.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Tongue River Alternative would result in the removal of 51.0 acres of prairie dog colony habitat in the right-of-way and road relocation footprints (Table 8.5-3). Twenty-six active prairie dog colonies[4] exist in the 0.5-mile study area (Figure 8.5-3), including 10 within the right-of-way. One of the 26 colonies exceeds the USFWS 80-acre requirement for black-footed ferret habitat and is located within the right-of-way (Table 8.5-4). The colonies within the right-of-way and road relocation footprints would be affected by habitat loss. Colonies outside of the right-of-way could be degraded, altered, or fragmented.

The black-footed ferret is not known to occur in the study area. Reintroduction efforts near the study area have failed, as prairie dogs, their primary prey, are highly susceptible to sylvatic plague, which can cause severe local population declines and extirpation of colonies. However, one prairie dog colony habitat is present in sufficient size to support black-footed ferrets, and it is assumed that black-footed ferrets could occur and could be affected by the disturbance of the prairie dog colony. Therefore, this build alternative *may affect, but is not likely to adversely affect* the black-footed ferret, as determined in the Biological Assessment (Appendix L, *Biological Assessment*).

Whooping Crane

No historical observations of whooping cranes exist in the study area, and no whooping cranes were observed in the study area during the 2013 baseline surveys. Habitats in the study area do not support breeding whooping cranes. Birds could occur near the Tongue River Alternative during migration, but this build alternative is more than 100 miles from the

[4] This number is cumulative. The 26 colonies include the 10 colonies within the right-of-way plus 16 outside of the right-of-way but within the study area. This applies to all build alternatives.

known whooping crane migration corridor. In the unlikely event whooping cranes were in the project area, they would be transient. Impacts could include noise related to construction. However, these impacts would be short-term or temporary and would not adversely affect the species. Therefore, construction of this build alternative *may affect, but is not likely to adversely affect* the whooping crane (Appendix L, *Biological Assessment*).

Swift Fox

Construction of the Tongue River Alternative would cause habitat loss, degradation, and alteration of grassland habitats as well as displacement and increased mortality rates for swift fox in the study area.

Raptors

Construction of the Tongue River Alternative would not result in the removal of any special-status raptor nests from the right-of-way. OEA identified four nests (two bald eagle nests and two burrowing owl nests) within 0.25 mile, six nests (two additional bald eagle nests) within 0.5 mile, and 17 special-status nests[5] within 2 miles of the right-of-way and road relocation footprints (Table 8.5-5, Figure 8.5-2). These nests would not be removed but could be affected by construction activities. The degree and type of impact would depend on the distance of the nest from the right-of-way. Nests or young closest to construction activities could be abandoned due to noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Greater Sage-Grouse

Construction of the Tongue River Alternative would remove 1,656.2 acres of greater sage-grouse general habitat (moderately dense sagebrush stands intermixed with grasslands in gentle topography) in the right-of-way and road relocation footprints. OEA identified one active lek in the 2-mile study area in 2013 with a total peak male count of one. There are no greater sage-grouse leks in the right-of-way, but OEA identified seven leks (four confirmed active and three unconfirmed) within 2 miles of the right-of-way, and a total of 12 leks[6] within 4 miles of the right-of-way. The degree of impact on greater sage-grouse would depend on the distance of the leks from the right-of-way and road relocations. Greater sage-grouse using these leks would be affected during construction activities, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, breeding, nesting, and brood rearing habitats as well as increased mortality rates. Greater sage-grouse using leks within 4 miles of the right-of-way and road relocations could

[5] This number is cumulative. The 17 nests within 2 miles of the right-of-way include the nests within 0.5 mile of the right-of-way, which includes the nests within 0.25 mile of the right-of-way. It does not include the nest(s) within the right-of-way. This applies to all build alternatives.

[6] This number is cumulative. The 13 leks within 4 miles of the right-of-way include the leks within 2 miles of the right-of-way. This applies to all build alternatives.

be affected, resulting in displacement due to habitat loss, degradation, and alteration of general habitats (Table 8.5-6, Figure 8.5-4). Construction of the Tongue River Alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Sprague's Pipit

Marginal habitat to support the Sprague's pipit is present along the northern portion of the Tongue River Alternative, where larger expanses of native prairie and mixed grass agriculture exist. Construction of this build alternative would cause habitat loss, degradation, and fragmentation; and construction noise could displace or disturb Sprague's pipit, if present. However, the habitat is of limited availability and low quality, the species has a low occurrence in the region and study area, and construction noise would be temporary. Construction of the Tongue River Alternative *may affect, but is not likely to adversely affect* the Sprague's pipit (Appendix L, *Biological Assessment*).

Nongame Birds

Construction of the Tongue River Alternative would affect seven special-status bird species, of which all are breeders in the study area. Impacts on the same number of bird species within 1 mile of the right-of-way could include displacement, increased mortality, and decreased reproductive success during construction activities in the right-of-way. The degree of impacts would depend on a number of variables, including security of nesting substrates, the species' or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impacts would be higher in species using grassland and shrubland habitats. These two habitats are available in greater proportion to other habitat types and more of these habitat types would be removed or disturbed by construction activities. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.17 individual per survey during the dawn chorus and 0.12 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Tongue River Alternative would affect two special-status amphibian species: great plains toad and plains spadefoot. These species would experience displacement and increased mortality rates. Construction would also create a barrier to movement for these species. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.07 individual per survey (Table 8.5-8).

Fish

The primary construction activity of the Tongue River Alternative with the potential to affect special-status fish species (Table 8.5-1) is the construction of one bridge crossing over the Tongue River near Ashland. Sauger and sturgeon chub are the only species that occur this far upstream, with the other species primarily occurring downstream of the Tongue and

Yellowstone Diversion Dam, located at about river mile 21. While this build alternative would cross two other fish-bearing streams (Cook and Otter Creeks), none of the special-status fish species are known or expected to occur in those streams. Construction activities on these two tributaries would slightly increase the potential for water quality impacts to reach the mainstem Tongue River, although best management practices would minimize these impacts. This build alternative would parallel the lower river reach of the Tongue River (downstream of Tongue and Yellowstone Diversion Dam) where all special-status fish species are expected to occur (Table 8.5-1). All of these species would be subject to limited construction-related impacts.

The Tongue River Alternative would be located within about 1,050 feet of the pallid sturgeon hatchery building at the Miles City Fish Hatchery, and within 450 feet of Rearing Pond 45. In 2007, Wilson, Ihrig & Associates, Inc. (WIA) conducted a detailed noise and vibration study of the Miles City State Fish Hatchery to evaluate noise and vibration impacts that could be caused by the proposed rail line. At that time, the rail alignment was planned to come within 1,050 feet of the hatchery headquarters building and 450 feet from the nearest outdoor pond. The Tongue River Alternative would be very close to this rail alignment. OEA reviewed the data and assumptions used in the WIA study and determined that these are still valid.

Pallid sturgeon appear to exhibit relatively few responses to external disturbances (stressors) compared to other fish species, based on the analysis of blood plasma cortisol concentrations of 12 fish species subjected to external stressors (Barton 2002). Similarly, low response levels were also observed in other sturgeon species evaluated (shovelnose sturgeon and paddlefish).

WIA concluded that existing sound pressure levels in the tanks (caused by pumps and other equipment) at the hatchery where pallid sturgeon are raised are greater than the levels that would be introduced from rail operation. WIA further concluded that ambient vibration in the tanks at the Miles City Fish Hatchery caused by hatchery operation, unrelated to railroads, is greater than the vibration that may result from rail operation. Thus, no measurable noise and vibration impacts on pallid sturgeon at the Miles City Fish Hatchery are anticipated, and the Tongue River Alternative would have *No Effect* on the species (Appendix L, *Biological Assessment*).

Plants

MNHP (2013) has not documented special-status plants in the right-of-way for the Tongue River Alternative. Predicted suitable habitat is mapped in the right-of-way for Barr's milkvetch, double bladderpod, heavy sedge, large flowered beardtongue, Nuttall desert-parsley, slender-branched popcorn flower, woolly twinpod, and narrowleaf milkweed. The woolly twinpod and heavy sedge have the greatest acreages of predicted suitable habitat mapped in the right-of-way. Most of the woolly twinpod habitat (317 acres) is considered of low suitability (Table 8.5-10). Road relocations would affect small areas of predicted

suitable habitat for double bladderpod, heavy sedge, large flowered beard tongue, and woolly twinpod (Table 8.5-11).

Operation

Whooping Crane

Operation of the Tongue River Alternative would result in the same type of impacts (noise) on whooping crane as described for construction.

Raptors

Operation of the Tongue River Alternative could displace bald eagles at 18 winter roost sites used by 23 roosting bald eagles in winter 2013. These roosts are used from November through February at a time when construction would not occur, so these impacts would be specific to operation. Although there are no winter concentration areas along this build alternative, resident pairs are known to roost near nests, and disturbances from operation could cause abandonment of established nesting sites (Table 8.5-9).

Greater Sage-Grouse

Operation of the Tongue River Alternative would cause habitat fragmentation and degradation of general sage-grouse habitat, as well as species displacement and increased mortality rates in the study area. Intermittent noise from operation and maintenance activities could cause decreased attendance or abandonment of four confirmed active leks. However, historical attendance records for these leks are generally low with only a few birds noted in most years. Historical peak count for this area is six, documented in 2002. Operation of the Tongue River Alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Sprague's Pipit

Operation of the Tongue River Alternative would result in the same type of impacts (noise) on Sprague's pipit as described for construction.

Fish

Operation of the Tongue River Alternative would permanently modify riparian and shoreline conditions in the bridge abutment footprint and adjacent shoreline areas. These riparian conditions would be affected by periodic maintenance of the bridge and track segments in the buffer. While the bridge-related effects would likely only affect sauger and sturgeon chub, the track maintenance activities could affect all special-status fish species in the lower river, below the Tongue and Yellowstone Diversion Dam. Bridge maintenance could result in the same effects associated with construction, including noise and vibration, sedimentation and turbidity, and possible spills of hazardous materials.

Similar to construction impacts, based on their review of analysis conducted at the hatchery (Womack & Associates 2007), OEA concluded that existing sound pressure levels in the hatchery tanks where pallid sturgeon are raised are greater than the levels that would be introduced from either the operation of the existing BNSF Railway Company (BNSF) line or the operation of any build alternative. OEA further concluded that ambient vibration in the hatchery tanks caused by hatchery operation, unrelated to railroads, is greater than the vibration that may result from operation of the proposed rail line. Thus, no measurable effect on pallid sturgeon at the Miles City Fish Hatchery is anticipated to occur during rail operation, and the Tongue River Alternative would have *No Effect* on the species (Appendix L, *Biological Assessment*).

Tongue River East Alternative

Construction of the Tongue River East Alternative would result in the removal of 3,824.0 acres of wildlife habitat within the right-of-way and road relocation footprints, most of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. Construction of the Tongue River East Alternative would generally result in the same types and quantities of impacts on each species group as described for the Tongue River Alternative.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Tongue River East Alternative would result in the same types and quantities of impacts on black-footed ferret and prairie dog colonies as described for the Tongue River Alternative (Table 8.5-3, Table 8.5-4).

Whooping Crane

Construction of the Tongue River East Alternative would result in the same types and quantities of impacts on whooping crane as described for the Tongue River Alternative.

Swift Fox

Construction of the Tongue River East Alternative would result in the same types and quantities of impacts on swift fox as described for the Tongue River Alternative.

Raptors

Construction of the Tongue River East Alternative would result in the removal of one bald eagle nest in the right-of-way. OEA identified four special-status bird nests (one bald eagle nest and three burrowing owl nests) within 0.25 mile, four nests within 0.5 mile, and a total of 17 nests within 2 miles of the right-of-way and road relocations (Table 8.5-5, Figure 8.5-2).

Greater Sage-Grouse

Construction of the Tongue River East Alternative would remove 1,870.5 acres of greater sage-grouse general habitat in the right-of-way. OEA identified one active lek with a total peak male count of one. There are no greater sage-grouse leks in the right-of-way, but OEA identified eight leks within 2 miles of the right-of-way and road relocations, and a total of 13 leks within 4 miles of the right-of-way (Table 8.5-6, Figure 8.5-4).

Sprague's Pipit

Construction of the Tongue River East Alternative would result in the same types and quantities of impacts on Sprague's pipit as described for the Tongue River Alternative.

Nongame Birds

Construction of the Tongue River East Alternative would affect five special-status bird species. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.19 individual per survey during the dawn chorus and 0.11 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Tongue River East Alternative would displace two special-status reptile and amphibian species: greater short-horned lizard and great plains toad. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.05 individual per survey (Table 8.5-8).

Fish

Construction of the Tongue River East Alternative would result in the same types and quantities of impacts on special-status fish species as described for the Tongue River Alternative.

Plants

Construction of the Tongue River East Alternative would affect special-status plant species generally as described for the Tongue River Alternative. The woolly twinpod, heavy sedge, and Barr's milkvetch have the greatest acreages of predicted suitable habitat mapped in the right-of-way. Most of the woolly twinpod and Barr's milkvetch predicted habitat is considered of low suitability (149.8 and 102.1 acres, respectively) (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for heavy sedge and large flowered beard tongue (Table 8.5-11).

Operation

Whooping Crane

Operation of the Tongue River East Alternative would result in the same types and quantities of impacts on whooping crane as described for the Tongue River Alternative.

Raptors

Operation of the Tongue River East Alternative could displace bald eagles at 16 roost sites used by 21 roosting bald eagles in winter 2013 (Table 8.5-9).

Greater Sage-Grouse

Operation of the Tongue River East Alternative would result in the same types and quantities of impacts on greater sage-grouse as described for the Tongue River Alternative.

Sprague's Pipit

Operation of the Tongue River East Alternative would result in the same types and quantities of impacts on Sprague's pipit as described for the Tongue River Alternative.

Fish

Operation of the Tongue River East Alternative would result in the same types and quantities of impacts on special-status fish species as described for the Tongue River Alternative.

Colstrip Alternatives

Colstrip Alternative

Construction of the Colstrip Alternative would affect primarily mixed grassland and shrubland habitats as well as woodland habitats. A small amount of riparian habitat would be affected at river and tributary crossings. Construction of the Colstrip Alternative would result in the removal of 2,078.5 acres of wildlife habitat within the right-of-way and road relocation footprints, most of which is suitable habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. The sections below describe the specific impacts of the Colstrip Alternative on each of these species groups, in addition to its impacts on raptor nests.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Colstrip Alternative would result in the removal of 1.5 acres of prairie dog colony habitat in the right-of-way (Table 8.5-3). Two active prairie dog colonies exist in the 0.5-mile study area (Figure 8.5-3), of which one is in the right-of-way. The two colonies

within the Colstrip Alternative's study area do not exceed the USFWS 80-acre stipulation for black-footed ferret habitat (Table 8.5-4); therefore, this build alternative would not affect black-footed ferrets. The prairie dog colony in the right-of-way would be affected by habitat loss. Colonies outside of the right-of-way could be degraded, altered, or fragmented.

Raptors

Construction of the Colstrip Alternative would not result in the removal of any special-status raptor nests within the right-of-way. OEA identified two bald eagle nests within 2 miles of the right-of-way (Table 8.5-5, Figure 8.5-2). These nests would not be removed but could be affected by construction activities. Impacts at this distance could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Greater Sage-Grouse

Construction of the Colstrip Alternative would remove 759.7 acres of greater sage-grouse general habitat (moderately dense sagebrush stands intermixed with grasslands in gentle topography) in the right-of-way. OEA did not identify any active leks in 2013. There are no greater sage-grouse leks in the right-of-way, but OEA identified three leks within 2 miles of the right-of-way and road relocations and a total of four leks within 4 miles of the right-of-way. The degree of impact on greater sage-grouse would depend on the distance of the leks from the right-of-way and road relocations. Greater sage-grouse using these leks would be affected during construction activities, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, breeding, nesting, and brood rearing habitats as well as increased mortality rates. Greater sage-grouse using leks within 4 miles of the right-of-way and road relocations could be affected, resulting in displacement due to habitat loss, degradation, and alteration of general habitats (Table 8.5-6, Figure 8.5-4). Construction of the Colstrip Alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Nongame Birds

Construction of the Colstrip Alternative would affect four special-status bird species, of which all are breeders in the study area. Impacts on the same number of bird species within 1 mile of the right-of-way could include displacement, increased mortality, and decreased reproductive success during construction activities in the right-of-way. The degree of impacts would depend on a number of variables, including security of nesting substrates, the species' or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impacts would be higher in species using grassland and shrubland habitats. These two habitats are available in greater proportion to other habitat types and more of these habitat types would be removed or disturbed by construction activities. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.06 individual per survey during the dawn chorus and 0.19 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Colstrip Alternative would displace one special-status amphibian species: plains spadefoot. This species would experience displacement and increased mortality rates. Construction would also create a barrier to movement for this species. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.08 individual per survey (Table 8.5-8).

Fish

The primary construction activity of the Colstrip Alternative with the potential to affect special-status fish species (Table 8.5-1) is the construction of one bridge crossing over the Tongue River near Ashland. Sauger and sturgeon chub are the only species that occur this far upstream, with the other species primarily occurring downstream of the Tongue and Yellowstone Diversion Dam, located at about river mile 21. This build alternative would also cross Rosebud Creek, another fish-bearing stream that supports sauger. While the build alternative would cross two other fish-bearing streams (Cook and Otter Creeks), none of the special-status fish species are known or expected to occur in those streams. Construction activities on these two tributaries would slightly increase the potential for water quality impacts to reach the mainstem Tongue River, although best management practices would minimize this potential.

Plants

MNHP (2013) has not documented special-status plants in the right-of-way for the Colstrip Alternative. Predicted suitable habitat is mapped in the right-of-way for Barr's milkvetch, double bladderpod, heavy sedge, large flowered beardtongue, slender-branched popcorn-flower, woolly twinpod, and narrowleaf milkweed. The woolly twinpod has the greatest acreage of predicted habitat mapped in the right-of-way (340.4 acres), most of which is considered of low suitability (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for Barr's milkvetch, double bladderpod, heavy sedge, large flowered beard tongue, narrowleaf milkweed, and woolly twinpod (Table 8.5-11).

Operation

Raptors

Operation of the Colstrip Alternative could cause the displacement of bald eagles at three roost sites used by three roosting bald eagles in winter 2013. These roosts are used from November through February at a time when construction would not occur, so these impacts would be specific to operation. Although there are no winter concentration areas along this alternative, resident pairs are known to roost near nests, and disturbances from operation could cause abandonment of established nesting sites (Table 8.5-9).

Greater Sage-Grouse

Operation of the Colstrip Alternative would cause habitat fragmentation and degradation of general sage-grouse habitat as well as species displacement and increased mortality rates in the study area. Intermittent noise from operation and maintenance activities could cause decreased attendance or abandonment of one confirmed active lek; however, activity has not been documented at this lek since 1976. Operation of the Colstrip Alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Fish

Operation of the Colstrip Alternative would permanently modify riparian and shoreline conditions in the bridge abutment footprint and adjacent shoreline areas. These riparian conditions would be affected by periodic maintenance of the bridge and track segments. The only special-status species that would be affected by bridge maintenance would be the sauger and sturgeon chub. Bridge maintenance could result in the same impacts associated with construction, including noise and vibration, sedimentation and turbidity, and possible spills of hazardous materials.

Colstrip East Alternative

Construction of the Colstrip East Alternative would result in the removal of 2,122.0 acres of wildlife habitat within the right-of-way and road relocations, much of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. Construction of the Colstrip East Alternative would generally result in the same types and quantities of impacts on each species group as described for the Colstrip Alternative.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Colstrip East Alternative would result in the same types and quantities of impacts on black-footed ferret and prairie dog colonies as described for the Colstrip Alternative (Table 8.5-3, Table 8.5-4).

Raptors

Construction of the Colstrip East Alternative would not remove any special-status nests from the right-of-way. OEA identified one bald eagle nest within 0.25 mile, one nest within 0.5 mile, or two nests within 2 miles of the right-of-way and road relocations (Table 8.5-5, Figure 8.5-2).

Greater Sage-Grouse

Construction of the Colstrip East Alternative would remove 974.0 acres of greater sage-grouse general habitat in the right-of-way. OEA did not identify any active leks in 2013. There are no greater sage-grouse leks within the right-of-way, but OEA identified one confirmed and three unconfirmed leks within 2 miles and a total of five leks within 4 miles of the right-of-way (Table 8.5-6, Figure 8.5-4).

Nongame Birds

Construction of the Colstrip East Alternative would affect Brewer's sparrow and great blue heron, both of which are breeders in the study area. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.11 individual per survey during the dawn chorus and 0.33 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Colstrip East Alternative would affect one special-status reptile and amphibian species: greater short-horned lizard. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.00 individuals per survey (Table 8.5-8), as no special-status amphibians were detected during surveys.

Fish

Construction of the Colstrip East Alternative would result in the same types and quantities of impacts on special-status fish species as described for the Colstrip Alternative.

Plants

Construction of the Colstrip East Alternative would affect special-status plant species as described for the Colstrip Alternative. The woolly twinpod and Barr's milkvetch have the greatest acreage of predicted habitat mapped in the right-of-way, most of which is considered of low suitability (168.9 and 101.7 acres, respectively) (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for Barr's milkvetch, heavy sedge, large flowered beard tongue, narrowleaf milkweed, and woolly twinpod (Table 8.5-11).

Operation

Greater Sage-Grouse

Operation of the Colstrip East Alternative would generally result in the same types and quantities of impacts on greater sage-grouse as described for the Colstrip Alternative.

Fish

Operation of the Colstrip East Alternative would result in the same types and quantities of impacts on special-status fish species as described for the Colstrip Alternative.

Tongue River Road Alternatives

Tongue River Road Alternative

Construction

Construction of the Tongue River Road Alternative would affect primarily grassland and shrubland habitats. Riparian habitat would be affected at river and tributary crossings and small amounts of woodland habitat would also be affected in the Ashland area. Construction of Tongue River Road would result in the removal of 4,263.6 acres of wildlife habitat within the right-of-way and road relocation footprints, most of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. The sections below describe the specific impacts of the Tongue River Road Alternative on each of these species groups, in addition to its potential impacts on raptor nests.

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Tongue River Road Alternative would result in the removal of 50.1 acres of prairie dog colony habitat in the right-of-way and road relocations (Table 8.5-3). Sixteen active colonies exist in the 0.5-mile study area, including five within the right-of-way (Figure 8.5-3). Three of the 16 colonies exceed the USFWS 80-acre requirement as needed for black-footed ferret habitat and are within the right-of-way (Table 8.5-4). The colonies within the right-of-way would be affected by habitat loss. Colonies outside of the right-of-way could be degraded, altered, or fragmented.

The black-footed ferret is not known to occur in the study area. Reintroduction efforts near the study area have failed, as prairie dogs are highly susceptible to sylvatic plague, which can cause severe local population declines and extirpation of colonies. However, prairie dog colony habitat is present in sufficient size to support black-footed ferrets, and it is assumed that black-footed ferrets could occur and could be affected by the disturbance of prairie dog colonies. Therefore, this build alternative *may affect, but is not likely to adversely affect* the black-footed ferret (Appendix L, *Biological Assessment*).

Whooping Crane

No historical observations of whooping cranes exist in the study area, and no whooping cranes were observed in the study area during the 2013 baseline surveys. Habitats in the study area do not support breeding whooping cranes. Birds could occur near the Tongue River Road Alternative during migration, but the build alternative would be more than 100 miles from the known whooping crane migration corridor. In the unlikely event whooping cranes were in the project area, they would be transient. Impacts could include noise related to construction. However, these impacts would be short-term or temporary and would not adversely affect the species. Therefore, construction of this build alternative *may affect, but is not likely to adversely affect* the whooping crane (Appendix L, *Biological Assessment*).

Swift Fox

Construction of the Tongue River Road Alternative would cause habitat loss, degradation, and alteration of grassland as well as displacement and increased mortality rates for swift fox found in the study area.

Raptors

Construction of the Tongue River Road Alternative would not remove any special-status raptor nests from the right-of-way. OEA identified two burrowing owl nests within 0.25 mile, seven special-status nests (including four bald eagle nests and two burrowing owl nests) within 0.5 mile, and 17 nests within 2 miles of the right-of-way (Table 8.5-5, Figure 8.5-2). These nests would not be removed but could be affected by construction activities. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations. Nests or young closest to construction activities could be abandoned due to noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Greater Sage-Grouse

Construction of the Tongue River Road Alternative would remove 2,169.4 acres of greater sage-grouse general habitat (moderately dense sagebrush stands intermixed with grasslands in gentle topography) in the right-of-way and road relocation footprints. OEA identified two active leks in 2013 with a total peak male count of two. There are no greater sage-grouse leks in the right-of-way, but OEA identified four leks (two confirmed active and two unconfirmed) within 2 miles and a total of 12 leks within 4 miles of the right-of-way and could be affected during construction activities in the right-of-way and road relocations. The degree of impact on greater sage-grouse would depend on the distance of the leks from the right-of-way and road relocations. Greater sage-grouse using these leks would be affected during construction activities, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, breeding, nesting, and brood rearing habitats as well as increased mortality rates. Greater sage-grouse using leks within 4 miles of the right-of-way could be affected, resulting in displacement due to habitat loss, degradation, and alteration of general habitats (Table 8.5-6, Figure 8.5-4). Construction of the Tongue River Road Alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Sprague's Pipit

Marginal habitat to support Sprague's pipit is present along the northern portion of the Tongue River Road Alternative, where larger expanses of native prairie and mixed grass agriculture exist. Impacts from construction of this build alternative would cause habitat loss, degradation, and fragmentation; construction noise could displace or disturb Sprague's pipit, if present. However, the habitat is of limited availability and low quality, the species has low occurrence in the region and study area, and construction noise would be temporary.

Construction of the Tongue River Road Alternative *may affect, but is not likely to adversely affect* the Sprague's pipit (Appendix L, *Biological Assessment*).

Nongame Birds

Construction of the Tongue River Road Alternative would affect eight special-status bird species, of which all are breeders in the study area. Impacts on the same number of bird species within 1 mile of the right-of-way could include displacement, increased mortality, and decreased reproductive success during construction activities in the right-of-way. The degree of impacts would depend on a number of variables, including security of nesting substrates, the species' or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impacts would be higher in species using grassland and shrubland habitats. These two habitats are available in greater proportion to other habitat types and more of these habitat types would be removed or disturbed by construction activities. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.17 individual per survey during the dawn chorus and 0.11 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Tongue River Road Alternative would affect two special-status amphibian species: great plains toad and plains spadefoot. These species would experience displacement and increased mortality rates. Construction would also create a barrier to movement for these species. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.17 individual per survey (Table 8.5-8).

Fish

Construction of the Tongue River Road Alternative would affect special-status fish species as described for the Tongue River Alternative. However, the proximity of the Tongue River crossing to the habitat potentially occupied by all of these species would increase the potential for construction-related impacts. The Tongue River Road Alternative would also cross three more fish-bearing tributary streams than the Tongue River Alternative, increasing the potential for construction impacts (i.e., turbidity and hazardous spill) to reach the Tongue River, and thereby affecting the special-status fish species. Overall, this build alternative would have a greater potential to affect these species than the Tongue River Alternative or Colstrip Alternative, primarily because of the proximity of the Tongue River crossing to fish habitat and the potential occurrence of these species below the Tongue and Yellowstone Diversion Dam.

Construction of the Tongue River Road Alternative would affect special-status fish species and the pallid sturgeon at the Miles City Fish Hatchery as described for the Tongue River Alternative.

Plants

MNHP (2013) has not documented special-status plants in the right-of-way for the Tongue River Road Alternative. Predicted suitable habitat is mapped in the right-of-way for Barr's milkvetch, double bladderpod, heavy sedge, large flowered beardtongue, Nuttall desert-parsley, slender-branched popcorn-flower, and woolly twinpod. Woolly twinpod and heavy sedge have the greatest acreage of predicted habitat mapped in the right-of-way. Most of the woolly twinpod habitat is considered of low suitability (323.4 acres) (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for double bladderpod, heavy sedge, large flowered beard tongue, and woolly twinpod (Table 8.5-11).

Operation

Whooping Crane

Operation of the Tongue River Road Alternative would result in the same type of impacts (noise) on whooping crane as described for construction.

Raptors

Operation of the Tongue River Road Alternative could displace bald eagles at 16 roost sites used by 20 roosting bald eagles in winter 2013. These roosts are used from November through February at a time when construction would not occur, so these impacts would be specific to operation. Although there are no winter concentration areas along this build alternative, resident pairs are known to roost near nests, and disturbances from operation could cause abandonment of established nesting sites (Table 8.5-9).

Greater Sage-Grouse

Operation of the Tongue River Road Alternative would cause habitat fragmentation and degradation of general sage-grouse habitat, as well as species displacement and increased mortality rates in the study area. Intermittent noise from operation and maintenance activities could cause decreased attendance or abandonment of two confirmed active leks. Historical attendance records for these leks are generally low; however, leks are active in most years. Historical peak count for this area is nine documented in 2010. Operation of this build alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Sprague's Pipit

Operation of the Tongue River Road Alternative would result in the same type of impacts (noise) on Sprague's pipit as described for construction.

Fish

Operation of the Tongue River Road Alternative would affect special-status fish species as described for the Tongue River Alternative, except that Tongue River bridge maintenance activities would be closer to the expected distribution of special-status fish. The additional fish-bearing stream crossings would also increase the potential for water quality impacts from maintenance activities. Operation impacts of the Tongue River Road Alternative on the pallid sturgeon at the Mile City Fish Hatchery would be the same as described for the Tongue River Alternative.

Tongue River Road East Alternative

Construction of the Tongue River Road East Alternative would result in the removal of 4,237.9 acres of wildlife habitat within the right-of-way, most of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. Construction of the Tongue River Road East Alternative would result in the same types and quantities of impacts on each species group as described for the Tongue River Road Alternative.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Tongue River Road East Alternative would result in the same types and quantities of impacts on black-footed ferret and prairie dog colonies as described for the Tongue River Road Alternative (Table 8.5-3, Table 8.5-4, Figure 8.5-3).

Whooping Crane

Construction of the Tongue River Road East Alternative would result in the same types and quantities of impacts on whooping crane as described for the Tongue River Road Alternative.

Swift Fox

Construction of the Tongue River Road East Alternative would result in the same types and quantities of impacts on swift fox as described for the Tongue River Road Alternative.

Raptors

Construction of the Tongue River Road East Alternative would result in the same types and quantities of impacts on raptors as described for the Tongue River Road Alternative (Table 8.5-5, Figure 8.5-2).

Greater Sage-Grouse

Construction of the Tongue River Road East Alternative would remove 2,383.7 acres of greater sage-grouse general habitat in the right-of-way. OEA identified two active leks in

2013 with a total peak male count of two. No greater sage-grouse leks are in the right-of-way, but five leks (two confirmed active and three unconfirmed) are within 2 miles and a total of 13 leks within 4 miles of the right-of-way (Table 8.5-6, Figure 8.5-4).

Sprague's Pipit

Construction of the Tongue River Road East Alternative would result in the same types and quantities of impacts on Sprague's pipit as described for the Tongue River Road Alternative.

Nongame Birds

Construction of the Tongue River Road East Alternative would affect six special-status bird species, all of which are breeders in the study area. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.21 individual per survey during the dawn chorus and 0.10 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Tongue River Road East Alternative would affect three special-status reptile and amphibian species: greater short-horned lizard, great plains toad, and plains spadefoot. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.19 individual per survey (Table 8.5-8).

Fish

Construction of the Tongue River Road East Alternative would result in the same type of impacts on special-status fish species and the pallid sturgeon at the Mile City Fish Hatchery as described for the Tongue River Road Alternative.

Plants

Construction of the Tongue River Road East Alternative would result in the same type of impacts on special-status plant species as described for the Tongue River Road Alternative. Woolly twinpod, heavy sedge, and Barr's milkvetch have the greatest acreage of predicted habitat mapped in the right-of-way. Most of the woolly twinpod and Barr's milkvetch habitat is considered of low suitability (155.3 and 96.2 acres, respectively) (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for heavy sedge, large flowered beard tongue, and woolly twinpod (Table 8.5-11).

Operation

Whooping Crane

Operation of the Tongue River Road East Alternative would result in the same type of impacts (noise) on whooping crane as described for construction.

Raptors

Operation of the Tongue River Road East Alternative could displace bald eagles at 13 roost sites used by 17 roosting bald eagles in winter 2013 (Table 8.5-9).

Greater Sage-Grouse

Operation of the Tongue River Road East Alternative would result in the same types and quantities of impacts on greater sage-grouse as described for the Tongue River Road Alternative.

Sprague's Pipit

Operation of the Tongue River Road East Alternative would result in the same type of impacts (noise) on Sprague's pipit as described for construction.

Fish

Operation of the Tongue River Road East Alternative would result in the same type of impacts on special-status fish and pallid sturgeon as described for the Tongue River Road Alternative.

Moon Creek Alternatives

Moon Creek Alternative

Construction of the Moon Creek Alternative would affect primarily grassland and shrubland habitat. Riparian habitat would be affected along Moon Creek and at river and tributary crossings. Small amounts of woodland habitat would be affected in the Moon Creek and Ashland areas. Construction of the Moon Creek Alternative would result in the removal of 4,061.1 acres of wildlife habitat within the right-of-way and road relocations, most of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. The sections below describe the specific impacts of the Moon Creek Alternative on each of these species groups, in addition to its potential impacts on raptor nests.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Moon Creek Alternative would result in the removal of 45.2 acres of prairie dog colony habitat in the right-of-way and road relocations (Table 8.5-3). Twenty-three active prairie dog colonies exist in the 0.5-mile study area (Figure 8.5-3), including 11 within the right-of-way. None of the 23 colonies exceeds the USFWS 80-acre stipulation for black-footed ferret habitat (Table 8.5-4); therefore, this build alternative would not affect black-footed ferrets. The prairie dog colonies within the right-of-way and road relocation

footprints would be affected by habitat loss. Colonies outside of the right-of-way could be degraded, altered, or fragmented.

Whooping Crane

No historical observations of whooping cranes exist in the study area, and no whooping cranes were observed in the study area during the 2013 baseline surveys. Habitats in the study area do not support breeding whooping cranes. Birds could occur near the Moon Creek Alternative during migration, but the build alternative would be more than 100 miles from the known whooping crane migration corridor. In the unlikely event whooping cranes were in the project area, they would be transient. Impacts could include noise related to construction. However, these impacts would be short-term or temporary and would not adversely affect the species. Therefore, construction of this build alternative *may affect, but is not likely to adversely affect* the whooping crane (Appendix L, *Biological Assessment*).

Swift Fox

Construction of the Moon Creek Alternative would cause habitat loss, degradation, and alteration of grassland habitats as well as displacement and increased mortality rates for swift fox in the study area.

Raptors

Construction of the Moon Creek Alternative would not result in the removal of any special-status raptor nests from the right-of-way. OEA identified one bald eagle nest within 0.25 mile, two special-status species nests (an additional bald eagle nest) within 0.5 mile, and 13 special-status raptor species nests within 2 miles of the right-of-way (Table 8.5-5, Figure 8.5-2). These nests would not be removed but could be affected by construction activities. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations. Nests or young closest to construction activities could be abandoned due to noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Greater Sage-Grouse

Construction of the Moon Creek Alternative would remove 2,385.8 acres of greater sage-grouse general habitat (moderately dense sagebrush stands intermixed with grasslands in gentle topography) in the right-of-way. OEA identified two active leks in 2013 and a total peak male count of three. There are no greater sage-grouse leks in the right-of-way, but OEA identified one active greater sage-grouse lek in the Moon Creek drainage, approximately 0.1 mile (200 meters) from the right-of-way. This lek, which was active in 2013, would be abandoned because of construction activities. OEA also identified five leks (three confirmed active and two unconfirmed) within 2 miles and a total of 10 leks within 4 miles of the right-of-way. The degree of impact on greater sage-grouse would depend on the distance of the leks from the right-of-way and road relocations. Greater sage-grouse using these leks would

be affected during construction activities, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, breeding, nesting, and brood rearing habitats as well as increased mortality rates. Greater sage-grouse using leks within 4 miles of the right-of-way could be affected, resulting in displacement due to habitat loss, degradation, and alteration of general habitats (Table 8.5-6, Figure 8.5-4). Construction of this build alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Sprague's Pipit

Marginal habitat to support the Sprague's pipit is present along the northern portion of the Moon Creek Alternative, where larger expanses of native prairie and mixed grass agriculture exist. Impacts from construction of the proposed rail line would cause habitat loss, degradation, and fragmentation; construction noise could displace or disturb Sprague's pipit, if present. However, the habitat is of limited availability and low quality, the species has a low occurrence in the region and study area, and construction noise would be temporary. Construction of the Moon Creek Alternative *may affect, but is not likely to adversely affect* the Sprague's pipit (Appendix L, *Biological Assessment*).

Nongame Birds

Construction of the Moon Creek Alternative would affect at least six special-status bird species, all of which are breeders in the study area. Impacts on the same number of bird species within 1 mile of the right-of-way would include displacement, increased mortality, and decreased reproductive success during construction activities in the right-of-way and road relocations. The degree of impacts would depend on a number of variables, including security of nesting substrates, the species' or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impacts would be higher in species using grassland and shrubland habitats. These two habitats are available in greater proportion to other habitat types and more of these habitat types would be removed or disturbed by construction activities. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.11 individual per survey during the dawn chorus and 0.10 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Moon Creek Alternative would affect two special-status amphibian species: great plains toad and plains spadefoot. These species would experience displacement and increased mortality. Construction would also create a barrier to movement for these species. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.24 individual per survey (Table 8.5-8).

Fish

The primary construction activity of the Moon Creek Alternative with the potential to affect special-status fish species (Table 8.5-1) is the construction of one bridge crossing over the Tongue River near Ashland. However, sauger and sturgeon chub are the only species that occur this far upstream, with all special-status species primarily occurring downstream of the Tongue and Yellowstone Diversion Dam, located at about river mile 21. While the build alternative would cross three other fish-bearing streams (Cook, Otter, and Moon Creeks), none of the special-status fish species are known or expected to occur in those streams. However, construction activities on Cook and Otter Creeks would slightly increase the potential for water quality impacts to reach the mainstem Tongue River, although best management practices would minimize this potential.

Plants

MNHP (2013) has mapped a 2,204-acre bractless blazingstar polygon along the Yellowstone River in the area where the Moon Creek Alternative would tie into the existing BNSF rail line. The last survey, when the plant was last observed, was 1954. The Moon Creek Alternative right-of-way would affect approximately 20 acres of the 2,204-acre bractless blazingstar polygon.

Predicted suitable habitat is mapped in the right-of-way for Barr's milkvetch, double bladderpod, heavy sedge, large flowered beardtongue, slender-branched popcorn-flower, woolly twinpod, and narrowleaf milkweed. Woolly twinpod and heavy sedge have the greatest acreage of predicted habitat mapped in the right-of-way. Most of the predicted woolly twinpod habitat is considered of low suitability (318.5 acres) (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for double bladderpod, heavy sedge, large flowered beard tongue, and woolly twinpod (Table 8.5-11).

Operation

Whooping Crane

Operation of the Moon Creek Alternative would result in the same type of impacts (noise) on whooping crane as described for construction.

Raptors

Operation of the Moon Creek Alternative could displace bald eagles at 13 winter roost sites used by 16 roosting bald eagles in winter 2013. These roosts are used from November through February at a time when construction would not occur, so these impacts would be specific to operation. Although there are no winter concentration areas along this build alternative, resident pairs are known to roost near nests, and disturbances from operation could cause abandonment of established nesting sites (Table 8.5-9).

Greater Sage-Grouse

Operation of the Moon Creek Alternative would cause habitat fragmentation and degradation of general sage-grouse habitat as well as species displacement and increased mortality rates for greater sage-grouse in the study area. Intermittent noise from operation and maintenance activities could cause decreased attendance or abandonment of three confirmed active leks. However, historical attendance records for these leks are generally low with only a few birds noted in most years, but leks are active in most years. Historical peak count for this area is six documented in 2002. Operation of this build alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Sprague's Pipit

Operation of the Moon Creek Alternative would result in the same type of impacts (noise) on Sprague's pipit as described for construction.

Fish

Operation of the Moon Creek Alternative would permanently modify riparian and shoreline conditions in the bridge abutment footprint and adjacent shoreline areas. These riparian conditions would be affected by periodic maintenance of the bridge and track segments. The only special-status species that would be affected by bridge maintenance would be the sauger and sturgeon chub at the Tongue River bridge crossing. Bridge maintenance could result in the same impacts associated with construction, including noise and vibration, sedimentation and turbidity, and possible spills of hazardous materials.

Moon Creek East Alternative

Construction of the Moon Creek East Alternative would result in the removal of 4,071.9 acres of wildlife habitat within the right-of-way and road relocations, most of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. Construction of the Moon Creek East Alternative would generally result in the same types and quantities of impacts on each species group as described for the Moon Creek Alternative.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Moon Creek East Alternative would result in the same types and quantities of impacts on the black-footed ferret and prairie dog colonies as described for the Moon Creek Alternative (Table 8.5-3, Table 8.5-4, Figure 8.5-3).

Whooping Crane

Construction of the Moon Creek East Alternative would result in the same types and quantities of impacts on the whooping crane as described for the Moon Creek Alternative.

Swift Fox

Construction of the Moon Creek East Alternative would result in the same types and quantities of impacts on the swift fox as described for the Moon Creek Alternative.

Raptors

Construction of the Moon Creek East Alternative would result in the removal of one bald eagle nest in the right-of-way. One nest within 0.5 mile and 13 nests within 2 miles of the right-of-way would not be removed (Table 8.5-5, Figure 8.5-2).

Greater Sage-Grouse

Construction of the Moon Creek East Alternative would remove 2,600.1 acres of greater sage-grouse general habitat in the right-of-way. OEA identified two active leks in 2013 and a total peak male count of three. There are no greater sage-grouse leks in the right-of-way, but OEA identified six leks within 2 miles of the right-of-way and road relocations, and a total of 11 leks within 4 miles of the right-of-way (Table 8.5-6, Figure 8.5-4).

Sprague's Pipit

Construction of the Moon Creek East Alternative would result in the same types and quantities of impacts on Sprague's pipit as described for the Moon Creek Alternative.

Nongame Birds

Construction of the Moon Creek East Alternative would affect four special-status bird species, all of which are breeders in the study area. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.13 individual per survey during the dawn chorus and 0.08 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Moon Creek East Alternative would affect three special-status reptile and amphibian species: greater short-horned lizard, great plains toad, and plains spadefoot. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.29 individual per survey (Table 8.5-8).

Fish

Construction of the Moon Creek East Alternative would result in the same types and quantities of impacts on special-status fish species as described for the Moon Creek Alternative.

Plants

Construction of the Moon Creek East Alternative would result in the same types and quantities of impacts on special-status plant species as described for the Moon Creek Alternative, including the bractless blazingstar area. Woolly twinpod, heavy sedge, and Barr's milkvetch have the greatest acreage of predicted habitat mapped in the right-of-way. Most of the woolly twinpod and Barr's milkvetch predicted habitat is considered of low suitability (151.2 and 102.1 acres, respectively) (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for heavy sedge, large flowered beard tongue, and woolly twinpod (Table 8.5-11).

Operation

Whooping Crane

Operation of the Moon Creek East Alternative would result in the same type of impacts (noise) on whooping crane as described for construction.

Raptors

Operation of the Moon Creek East Alternative could displace bald eagles at 11 roost sites used by 14 roosting bald eagles in winter 2013 (Table 8.5-9).

Greater Sage-Grouse

Operation of the Moon Creek East Alternative would result in the same types and quantities of impacts on greater sage-grouse as described for the Moon Creek Alternative.

Sprague's Pipit

Operation of the Moon Creek East Alternative would result in the same type of impacts (noise) on Sprague's pipit as described for construction.

Fish

Operation of the Moon Creek East Alternative would result in the same types and quantities of impacts on special-status fish species as described for the Moon Creek Alternative.

Decker Alternatives

Decker Alternative

Construction of the Decker Alternative would affect primarily woodland and grassland habitats. Small amounts of shrubland and riparian habitats would be affected at river and tributary crossings. Construction of the Decker Alternative would result in the removal of 2,841.8 acres of wildlife habitat within the right-of-way and road relocations, most of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. The sections below describe the specific impacts of the Decker Alternative on each of these species groups, in addition to its potential impacts on raptor nests.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Decker Alternative would result in the removal of 1.5 acres of prairie dog colony habitat in the right-of-way (Table 8.5-3). Three active prairie dog colonies exist in the 0.5-mile study area (Figure 8.5-3), including one within the right-of-way. The three prairie dog colonies in the Decker Alternative's study area do not exceed the USFWS 80-acre stipulation for black-footed ferret habitat (Table 8.5-4); therefore, this build alternative would not affect black-footed ferrets. The colony within the right-of-way would be affected by habitat loss. Colonies outside of the right-of-way could be degraded, altered, or fragmented.

Raptors

Construction of the Decker Alternative would not result in the removal of any special-status raptor nests from the right-of-way. OEA identified seven bald eagle nests within 2 miles of the right-of-way (Table 8.5-5, Figure 8.5-2). These nests would not be removed but could be affected by construction activities. The degree and type of impact would depend on the distance of the nest from the right-of-way and road relocations. Nests or young closest to construction activities could be abandoned due to noise or human activity. Impacts at all distances could include abandonment of territories or the loss, degradation, or fragmentation of foraging habitat.

Greater Sage-Grouse

Construction of the Decker Alternative would remove 1,458.4 acres of greater sage-grouse general habitat (moderately dense sagebrush stands intermixed with grasslands in gentle topography) in the right-of-way and road relocations. OEA did not identify active leks in 2013. There are no greater sage-grouse leks in the right-of-way, but OEA identified three leks (unconfirmed) within 2 miles and a total of four leks within 4 miles of the right-of-way, which could be affected by construction activities in the right-of-way and road relocations. The degree of impact on greater sage-grouse would depend on the distance of the leks from

the right-of-way and road relocations. Greater sage-grouse using these leks would be affected during construction activities, resulting in displacement and reduced survival due to habitat loss, degradation, and alteration of foraging, breeding, nesting, and brood rearing habitats as well as increased mortality rates. Greater sage-grouse using leks within 4 miles of the right-of-way could be affected, resulting in displacement due to habitat loss, degradation, and alteration of general habitats (Table 8.5-6, Figure 8.5-4). Construction of the Decker Alternative *may affect, but is not likely to adversely affect* the greater sage-grouse (Appendix L, *Biological Assessment*).

Nongame Birds

Construction of the Decker Alternative would affect four special-status bird species, all of which are breeders in the study area. Impacts on the same number of bird species within 1 mile of the right-of-way could include displacement, increased mortality, and decreased reproductive success during construction activities in the right-of-way. The degree of impacts would depend on a number of variables, including security of nesting substrates, the species' or individuals' sensitivity to disturbance, breeding cycles, proximity to disturbance, and possible topographic shielding; however, the degree of impacts would be higher in species using grassland and shrubland habitats. These two habitats are available in greater proportion to other habitat types and more of these habitat types would be removed or disturbed by construction activities. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.13 individual per survey during the dawn chorus and 0.12 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Decker Alternative would affect two special-status amphibian species: great plains toad and plains spadefoot. These species would experience displacement and greater mortality rates. Construction would also create a barrier to movement for these species. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.16 individual per survey (Table 8.5-8).

Fish

The primary construction activity of the Decker Alternative with the potential to affect special-status fish species (Table 8.5-1) is the construction of one bridge crossing over the Tongue River. However, sauger and sturgeon chub are the only species that occur this far upstream, with all other special-status fish species primarily occurring downstream of the Tongue and Yellowstone Diversion Dam, located at about river mile 21. No other fish-bearing streams would be crossed by the Decker Alternative.

Plants

MNHP (2013) has mapped a 2-acre Nuttall desert-parsley polygon entirely within the Decker Alternative right-of-way. The last survey, when the plant was last observed, was in 2002.

Predicted suitable habitat is mapped in the right-of-way for Barr's milkvetch, double bladderpod, heavy sedge, large flowered beardtongue, Nuttall desert-parsley, slender-branched popcorn-flower, and woolly twinpod. Woolly twinpod and Barr's milkvetch have the greatest acreage of predicted habitat mapped in the right-of-way; nearly half of the Barr's milkvetch habitat is considered high suitability and just over half of the woolly twinpod habitat is considered moderate or high suitability (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for Barr's milkvetch, heavy sedge, and woolly twinpod (Table 8.5-11).

Operation

Raptors

Operation of the Decker Alternative could displace bald eagles at nine roost sites and one winter concentration area, used by 16 roosting bald eagles in winter 2013. These roosts are used from November through February at a time when construction would not occur, so these impacts would be specific to operation. Resident pairs are known to roost near nests, and disturbances from operation could cause abandonment of established nesting sites (Table 8.5-9).

Fish

Operation of the Decker Alternative would permanently modify riparian and shoreline conditions in the bridge abutment footprint and adjacent shoreline areas. These riparian conditions would be affected by periodic maintenance of the bridge and track segments in the buffer. The bridge maintenance would likely only affect sauger and sturgeon chub. Bridge maintenance could result in the same impacts associated with construction, including noise and vibration, sedimentation and turbidity, and possible spills of hazardous materials.

Decker East Alternative

Construction of the Decker East Alternative would result in the removal of 2,710.8 acres of wildlife habitat within the right-of-way and road relocations, most of which is considered habitat for special-status mammals, birds, reptiles, and amphibians. Predicted suitable habitat for special-status plants would also be removed. Construction of the Decker East Alternative would generally result in the same types and quantities of impacts on each species group as described for the Decker Alternative.

Construction

Black-Footed Ferret and Prairie Dog Colonies

Construction of the Decker East Alternative would result in the removal of 1.6 acres of prairie dog colony habitat (Table 8.5-3). Three active prairie dog colonies exist in the 0.5-mile study area (Figure 8.5-3), including two within the right-of-way. The three prairie

dog colonies in the Decker East Alternative's study area do not exceed the USFWS 80-acre stipulation for black-footed ferret habitat (Table 8.5-4); therefore, this build alternative would not affect the black-footed ferret. The colony within the right-of-way would be affected by habitat loss. Colonies outside of the right-of-way could be degraded, altered, or fragmented.

Raptors

Construction of the Decker East Alternative would result in the same types and quantities of impacts on raptors as described for the Decker Alternative (Table 8.5-5, Figure 8.5-2).

Greater Sage-Grouse

Construction of the Decker East Alternative would remove 1,625.6 acres of greater sage-grouse general habitat in the right-of-way and road relocations. Construction of the Decker East Alternative would result in the same types and quantities of impacts on greater sage-grouse leks as described for the Decker Alternative (Table 8.5-6, Figure 8.5-4).

Nongame Birds

Construction of the Decker East Alternative would affect four special-status bird species. Special-status bird species abundance within 1 mile of the right-of-way was calculated at 0.15 individual per survey during the dawn chorus and 0.14 individual per survey during nocturnal call surveys (Table 8.5-7).

Reptiles and Amphibians

Construction of the Decker East Alternative would affect three special-status species: greater short-horned lizard, great plains toad, and plains spadefoot. Special-status amphibian species abundance for the study area of this build alternative was measured at 0.18 individual per survey (Table 8.5-8).

Fish

Construction of the Decker East Alternative would result in the same types and quantities of impacts on special-status fish species as described for the Decker Alternative.

Plants

Construction of the Decker East Alternative would result in the same types of impacts on special-status plant species as described for the Decker Alternative, including the Nuttall desert-parsley polygon (Table 8.5-10). Road relocations would affect small areas of predicted suitable habitat for Barr's milkvetch, heavy sedge, and woolly twinpod (Table 8.5-11).

Operation

Raptors

Operation of the Decker East Alternative could displace bald eagles at seven roost sites, including one winter concentration area, used by 14 roosting bald eagles in winter 2013 (Table 8.5-9).

Fish

Operation of the Decker East Alternative would affect special-status fish species as described for the Decker Alternative.

8.5.4.3 No-Action Alternative

Under the No-Action Alternative, TRRC would not construct and operate the proposed Tongue River Railroad, and there would be no impacts on special-status species from construction or operation of the proposed rail line.

8.5.4.4 Mitigation and Unavoidable Environmental Consequences

To avoid or minimize the environmental impacts on special-status species from the proposed rail line, OEA is recommending that the Board impose seven mitigation measures, including two measures volunteered by TRRC (Chapter 19, Section 19.2.5.2, *Special-Status Species*). These measures would require TRRC to avoid disturbing eagle nests with routine inspections and time construction accordingly, work with appropriate agencies to survey greater sage-grouse and provide habitat mitigation, consult and comply with the requirements of the Montana Sage Grouse Habitat Conservation Program, hire a biologist for a search of special-status plant species in the right-of-way, conduct surveys of prairie dog colonies, consult with appropriate federal agencies regarding the presence of endangered and threatened species in construction areas, and avoid disturbing bald eagles during nesting season (February 1 through August 15).

Even with the implementation of OEA's recommended mitigation measures and TRRC's voluntary measures, the proposed rail line would cause unavoidable impacts on special-status species. These impacts could include the removal of habitat for black-footed ferret, swift fox, greater sage-grouse, Sprague's pipit, nongame birds, and reptiles and amphibians; disturbance of raptor nests; disturbance of activity at greater sage-grouse leks; creation of barriers to amphibian and reptile movement; water quality impacts that could affect special-status fish; and loss of predicted suitable habitat for plant species in the right-of-way and road relocation footprints. OEA concludes that these adverse impacts would be minor.

8.6 Applicable Regulations

Different federal, state, and local jurisdictions are responsible for the regulation of biological resources. These entities and the regulations guidance related to biological resources are summarized in Table 8.6-1.

Table 8.6-1. Regulations and Guidance related to Vegetation, Wildlife, Fish, and Special-Status Species

Regulation, Statute, Guideline	Explanation
Federal	
USFWS oversees federal statutes regarding the protection of wildlife, special-status species, and their critical habitats. BLM manages habitats on BLM-administered lands and coordinates with other wildlife agencies to ensure that BLM or other federal actions on BLM-administered lands do not result in sensitive species being listed as threatened or endangered. BLM field offices maintain lists of sensitive species that require special management on public lands under their administration. These species may be so designated by the BLM State Director and are managed using all available methods to improve the condition of the species and their habitats.	
National Environmental Policy Act (42 U.S.C. § 4321 *et seq*.)	Requires the consideration of potential environmental effects, including potential effects of (or on) contaminated sites in the environmental impact statement for any proposed major federal agency action. NEPA implementation procedures are set forth in the President's Council on Environmental Quality's Regulations for Implementing NEPA (40 C.F.R. Part 1500).
Endangered Species Act (16 U.S.C. § 531)	Protects all vegetation, fish, and wildlife species that are in danger of extinction as well as the habitats critical to their survival. USFWS manages the listing of special-status species and their habitats as endangered, threatened, proposed, or candidate species.
Migratory Bird Treaty Act (16 U.S.C § 703)	Protects birds that migrate between the United States, Canada, Mexico, Japan, or Russia.
Bald and Golden Eagle Protection Act of 1940 (16 U.S.C § 608)	Protects bald and golden eagles, their nests, and their eggs from harm or disturbance.
Fish and Wildlife Coordination Act of 1934 (16 U.S.C. § 661)	Evaluates impacts on vegetation, fish, and wildlife species and considers mitigation for proposed water resource development projects. USFWS and state wildlife management agencies coordinate actions.
Federal Land Policy and Management Act of 1976 (43 U.S.C. § 1701 *et seq.*)	Provides guiding principles for public land management by BLM in the development of renewable and nonrenewable resources, managing the use of resources to ensure the future productivity of the land, and environmental protection.
BLM Internal Memorandum 2005-024: National Sage-Grouse Habitat Conservation Strategy	Requires BLM to analyze and consider impacts on sagebrush habitat and sagebrush-dependent wildlife species (including greater sage-grouse) in the land use planning efforts for public lands with sage-grouse and sagebrush habitats.

Regulation, Statute, Guideline	Explanation
State	
Montana FWP manages all wildlife, fish, game, game and nongame birds, waterfowl, and the game and fur-bearing animals of the state (MCA 87-1-201). Montana FWP has developed policies conservation strategies, and management plans to protect wildlife species and their habitats. Montana FWP policies and recommendations tier to federal policies and aid in enforcing all laws and policies protecting habitats and wildlife. Montana FWP maintains a statewide list of species of concern, which are so designated based on population numbers, habitat threats, or lack of population data. These species are given special considerations in conservation, land use, and development planning.	
Montana Environmental Policy Act (MCA 75)	Provides for adequate review and interdisciplinary analysis of state actions that have an impact on Montana's human environment in order to ensure that environmental attributes are fully considered.
Nongame and Endangered Species Conservation Act (MCA 87-5, Part 1)	Provides for the protection of nongame and state-listed endangered wildlife species.
Comprehensive Fish and Wildlife Conservation Strategy (2005)	Provides a comprehensive assessment of Montana's critical wildlife habitats and the species that need special attention. Identifies conservation goals to prevent species from becoming threatened or endangered.
Management Plan and Conservation Strategies for Sage Grouse in Montana-Final (2005)	Guides local management efforts and coordinates management across jurisdictional boundaries for the long-term conservation and enhancement of the sagebrush steppe/mixed-grass prairie complex to support sage grouse and a healthy diversity and abundance of wildlife species and human uses.
Executive Order Creating the Montana Sage-Grouse Oversight Team and the Montana Sage Grouse Habitat Conservation Program (Executive Order 10-2014) (2014)	Creates an oversight team and provides development stipulations for greater sage-grouse Core Areas, Connectivity Areas, or General Habitat that must be implemented for the protection and conservation of greater sage-grouse in Montana.
Conservation Plan for Black-Tailed and White-Tailed Prairie Dogs in Montana (2002)	Provides advice to accommodate the needs of prairie dogs and associated species. Considers the changing demands and expectations of the general public, affected stakeholders, and the agencies responsible for conservation of Montana's wildlife and rangeland.
Montana Bald Eagle Management Guidelines: An Addendum to Montana Bald Eagle Management Plan (2010)	Provides updated guidelines for bald eagle management after the eagle's removal from the USFWS Threatened and Endangered Species list.
Montana Natural Streambed and Land Preservation Act (310 Permit)	Protects and preserves streams and rivers in their natural or existing state. Requires that any private, nongovernment individual or entity that proposes to work in or near a stream on public or private land obtain a 310 permit.
Montana Stream Protection Act (124 Permit)	Protects and preserves fish and wildlife resources by maintaining streams and rivers in their natural or existing state. Requires that any agency proposing a project that may affect the bed or banks of any stream in Montana obtain a 124 permit.
Montana Land-Use License of Easement on Navigable Waters	Protects riparian areas, the navigable status of a waterbody, and the beneficial use of state lands for public and private purposes in a manner that will provide revenues without harming the long-term capability of the land or restricting the original commercial navigability. Any entity proposing a project on lands below the low-water mark of navigable waters must obtain a Montana Land-Use License of Easement on Navigable Waters.

Regulation, Statute, Guideline	Explanation
Montana County Noxious Weed Control Law (MCA 7-2101 through 2153)	Establishes criteria for the control and management of noxious weeds. Prohibits the propagation or seeding of any noxious weed on private land. Adherence to the noxious weed management program of the weed management district or compliance with a noxious weed management agreement is considered compliant with the law.
Control of Fire Hazard Along Rail Rights-of-Way (MCA 69-14-721)	Requires railroads to keep areas along the track free of any dangerous or combustible materials to reduce the potential for railroad-caused fires. Any railroad failing to comply is liable for damages because of fire emanating from the trains, track maintenance, or other railroad operations.
Maintenance of Fireguards (MCA 69-14-722)	Requires railroads to plow fireguards parallel to the track wherever the railroad passes through rangelands and grazing lands, and to burn all grass and vegetation inside of the plowed fireguard. The purpose of this requirement is to stop and contain any fires that may be started by train operations. If a railroad fails to comply, the board of county commissioners of the county where the violation occurs will cause the neglected plowing, burning, or both to be done; the railroad company is liable further for all damages caused by its failure to comply with this statute.
Railroad Fence and Opening Requirements (MCA 69-14-701, 69-14-702)	Requires railroads to build and maintain fences on both sides of the right-of-way; and for fencing in grazing lands, fence openings (no less than 60 feet in width) are required every 4 miles.
Local	
No local statutes, regulations, or guidelines apply to biological resources.	

Notes:
USFWS = U.S. Fish and Wildlife Service; BLM = Bureau of Land Management; U.S.C. = United States Code; NEPA = National Environmental Policy Act; C.F.R. = Code of Federal Regulations; Montana FWP = Montana Fish, Wildlife & Parks; MCA = Montana Code Annotated